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ABSTRACT

This report presents detailed procedures and findings of research on Japanese high school seniors, their choice of courses, educational and career expectations and preferences, and the extent to which these attitudes conform to relationships in Japanese labor markets. Data came from a 1966 survey of 7,000 male high school seniors enrolled in general, commerce, agricultural, and technical curriculums, with supplementary data from the students' fathers. This first volume of the five-volume report includes an overview of the entire study and an introductory chapter. Japan was chosen for this study because of the exceptional data coverage and reliability, and the notable similarities and contrast with the United States in relevant educational matters. In this volume a generalized sequential human-investment and career decision model is presented, which permits the inclusion of both monetary and non-monetary factors. The five volumes are available as VT 013 653-013 657. (BH)

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A THEORETICAL AND EMPIRICAL ANALYSIS OF VOCATIONAL PREPARATION IN JAPAN

Volume I of five volumes

Learning, Working and Earning:
Preview and Review

December, 1970

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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Volume I of five volumes

Learning, Working and Earning: Preview and Review

Project Grant No. OEG-3-6-000537-0744
Project No. 5-1325

Mary Jean Bowman
Hideo Ikeda
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December, 1970

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PREFACE AND ACKNOWLEDGMENTS

This Report presents in considerable detail the procedures and findings of research on Japanese upper-secondary-school students, their allocations among types of courses, their educational and career expectations and preferences, and how far in the aggregate those expectations and preferences may conform to relationships in Japanese labor markets. While work supported by the U.S. Office of Education makes up the bulk of these materials, we have drawn also on related work that constitutes part of research supported by the Carnegie Foundation. The authors owe thanks to both the U.S. Office of Education and the Carnegie Foundation for support of these endeavors.

The materials are presented in five volumes, primarily because of their bulk. Volume I includes the abstract and the introductory chapter for the full report. While Chapter I lays the groundwork for the chapters to follow, it says nothing about findings or their interpretation, whereas the Abstract concentrates on those findings. Also, the Abstract is written at a much lower conceptual level, and is deliberately oriented toward discussion of what the Japanese pattern may mean in an American perspective. Volumes II, III and IV present and analyze the research findings. Volume V contains appendixes with necessary explanatory or supportive materials and also supplementary analyses.

Professor Bowman takes sole responsibility for Volumes I through IV in their present form. Professor Ikeda and Mr. Tomoda

have contributed substantially and indispensably in earlier stages of the work, almost from its inception. Also, some of their writings appear intact in Volume V. However, they have not had an opportunity to correct and revise the main body of the text, and they must not be held responsible for errors or for any inadequacy of references to Japanese sources. Neither are they to be held to account for any misguided interpretations and points of view that may have emerged in the preparation of this manuscript.

Mr. Harker, who is currently completing an independent study of education, production and communication behavior among Japanese farmers, assisted in numerous ways at later stages in the preparation of this Report as well. He wrote preliminary drafts of parts of Chapters II and III. More important, however, has been his role as a sounding board in talking out analysis plans and reassessments as we began to approach the final stages of the analysis. He is also doing a special small piece of work that will complement this report using matched data on farmers and their sons in our school sample population.

The chief empirical base of this research is in material collected from seniors in Japanese upper-secondary schools in 1966, supplemented by information obtained at the same time from their fathers. Indispensable for this work was the active cooperation of Japanese colleagues who participated in preparation and administration of the questionnaires. First and foremost among those

whose names do not appear as actual co-authors, I must express my deep appreciation to Professor Michiya Shimbori of Hiroshima University, and for many things--for his early interest and his role in enlisting Professor Ikeda and Mr. Tomoda in the undertaking, for later extensive contributions of time and insights in the development of the questionnaires and the plans for carrying out the field work, and for his committed devotion in standing back of the field operations to iron out problems and see that everything was brought to successful fruition. Professors Ikeda and Tomoda share in this expression of gratitude, as in my thanks to other friends and colleagues in Japan. Before leaving Hiroshima, however, I must acknowledge the valuable role played by Mr. Tsuyashi Ishida as a member of the Shimbori-Ikeda-Tomoda-Ishida-Bowman team in questionnaire development and in other critical aspects of the research design in its early stages.

Before selecting schools for the sample or printing the questionnaires, we held a conference at Kyoto in which associates who would take responsibility for work in the Tokyo-Tochigi, the Osaka-Wakayama, and the Fukuoka areas were participants, along with several other advisers. (Professor Ikeda took direct responsibility for field work on the island of Shikoku and for coding the schedules from Shikoku and from the Osaka-Wakayama area. Mr. Tomoda ran the central office of the entire project (backed by Professor Shimbori) and he also took direct responsibility for field work in Hiroshima City and prefecture.) Revisions suggested

at the Kyoto conference were incorporated in the final form of the questionnaire, methods of questionnaire administration were fully discussed and agreed upon, and operational details were worked out. The ready and efficient cooperation manifested at this conference and thereafter were of immeasureable value. Furthermore, this active cooperation was offered despite the fact that the budget for field costs was tiny and there was no obviously attractive reward for such involvement. I hope that each of the men to whom I here express special thanks will read what I have written in this paragraph as part of my personal thanks to him.

Leading senior educational scholars and researchers who took primary responsibility for selecting the teams of junior colleagues to carry out the field work, or who supervised that work directly, were Professor Yoshihiro Shimizu of Tokyo University, Professor Hisao Kamidera of the Osaka City Institute for Education, and Professor Shigeo Matsui of the Institute for Comparative Education at Kyushu University. Also among the senior men who participated in the Kyoto conference were Professor Motoo Kaji and Mr. Seikichi Ando. Professor Kaji's economic sophistication, superb command of English, and skill in cross-cultural communication were of prime value in this conference. Mr. Anno's detailed knowledge of the Tokyo school system and his assistance in identifying characteristics of schools and school districts was invaluable for selection of an unbiased but appropriately stratified

sample of schools for the Tokyo area and his work served in part as a model for procedures elsewhere. Mrs. Reiko Imamura of the Research Bureau in the Japanese Ministry of Education also played a special and continuing part, facilitating work repeatedly and on many fronts.

Mr. Kunio Amano of the National Institute for Education in Tokyo both participated in the Kyoto conference and in final revisions of the questionnaire and led the field work in the Tokyo-Tochigi area--an exceptionally demanding task. Other men who took on special responsibilities in carrying out the field work included Professors Taoru Umakeshi and Susumu Yano of Kyushu University, Mr. Shinjo Okuda, head of the Research Section, Ministry of Education, and Professor Jiro Matsubara of Tokyo University.

Two Japanese wives deserve a special word of thanks, and not just for their patience and moral support. Mrs. Tomoda worked side by side with the rest of us in getting the successive revisions of questionnaires into shape, she was the bulwark of the office in Hiroshima during the period of fieldwork when Mr. Tomoda was trying to be in several places at once, and she kept things moving without error as the coding of schedules from the Tokyo, Hiroshima and Fukuoka offices piled up. Mrs. Ikeda joined with Professor Ikeda who combed the relevant literature in Japanese; she spent many hours in translating that work and then in pursuing evidence on questions concerning interpretations and related matters.

Finally, I take advantage of the otherwise unfortunate fact that problems of time and distance have dictated that this preface should be written by only one of the team of people who have been most deeply involved. It is a privilege to express here my profound and growing appreciation of the part played by my co-authors in this report. Looking back I have a feeling of overwhelming humility as I realize the extent of their patience, tolerance and goodwill through the ups and downs of a long-lasting and complex undertaking. To them I had best put it simply--just Thank You.

Mary Jean Bowman

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OVERVIEW

EDUCATION AND WORK ON THE DEVELOPMENT FRONTIERS: SOME LESSONS FROM JAPAN

The problems that come with success are many and they are sweeping across the economically advanced nations of the world even as the poorer and least developed nations find themselves astride a chasm, with old poverties on one side and a racing modern technology on the other. Be a nation rich or poor, economically leading or lagging, these "problems" connote both troubles and opportunities. For a problem is something that calls for a solution, and this implies a decision or set of decisions oriented toward the future. Appreciation of the fact that, viewed both as troubles and opportunities, the problems of the advanced nations may be fully as profound and as acute as those of the underdeveloped world has come upon us recently both as a series of assaults and a growing challenge. We are living today in one of those historic periods of accelerated change that shake and threaten or promise to re-form societal institutions. The hyphenation is deliberate; this is not a matter of "reform" in the moralistic sense, but of a reconstituting of the ways a society functions. And deeply enmeshed in a society are its educational practices and institutions. As a lead nation in educational and economic development, a nation with an educational system and labor markets that are at once both similar to those of the United States in important respects, distinctive in others, Japan offers a case study that should be very illuminating to Americans. The research reported here may thus be seen in a double orientation. On the one hand is the analysis of relationships between education and labor markets in Japan as an interest in its own right, but at the same time we are concerned with wider implications for the United States in particular and other nations of the industrialized world more generally.

This report constitutes part of a wider-ranging examination of schooling and labor markets in Japan. It is built mainly upon data obtained in 1966 from a sample of seven thousand male students in their last year of upper-secondary school. Five major curricula are represented: the academic general, the terminal general, commerce, agricultural, and technical-industrial. Some supplementary information is taken from questionnaires filled out by the students' fathers (and keyed to the interview-questionnaires obtained from their sons). Results from other aspects of our research, based on official publications and conducted in parallel with the present study have been drawn upon here where critical as a check against or for interpretation of internal evidence from our student questionnaires or for assessment of our samples. The nature of our data has of course conditioned the kinds of empirical analyses in which we could engaged; those data include information concerning the degree of metropolitanism or rural isolation of the community, parental traits (and derivative from these classroom socio-economic composition), student preferences with respect to secondary curricula and perceptions of their initial allocation into the present course of study, their behavior with respect to taking examinations for university, various aspects of their future career expectations and preferences, and perceptions of the ways in which labor markets operate. This report, like the complementary research financed by the Carnegie Corporation, is written to stand on its own. We may best begin, nevertheless, by locating what is written here in the framework it shares with our other researches. What, in brief, are the major issues and concerns, the major problem areas that have given rise to this work? And why was Japan chosen as the place in which to carry it out?

I. The Choice of Japan

In any research endeavor concerned with associations between schooling and work in industrially advanced nations there is good reason for looking carefully at Japan. This generalization applies with special force from the perspective of the United States. Everywhere among the economically advanced nations education has been part and parcel of an economic-technological revolution in which it has been both cause and effect--no one has yet managed to separate out the one from the other. But only in Japan and the United States has the educational operation been on so massive a scale; even Russia cannot match this diffusion of schooling among the population. At the same time, education has been both contributing and reacting to its own internal dynamic. The sheer scale of education in Japan and the United States contributes a momentum to that dynamic and a socio-economic power that can be awesome. At the same time many educators have a rising sense of frustration and relative impotence in the face of the increasingly complex and all-embracing tasks that men would put upon them. Meanwhile, whether it moves at headlong speed or at a more moderate pace, time moves with inexorable irreversability. Schools and educational systems are not things that can be played around with as though they were children's building blocks that could be knocked over and put together again at will. Real problems and societal decisions relating to them must be understood against this moving swell, which limits the real options on the one hand but which, paradoxically, may also give them a power and life far beyond our expectations. All of this Japan and the United States share.

But granted that Japan and the United States, and in considerable degree many of the other Western nations as well, share in the experiences and problems of an increasingly massive educational momentum, what, more specifically, are

the commonalities and contrasts most relevant in looking to Japan for illumination of problems and issues in the nexus of educational and labor-market interactions? We give an over-simplified summary here that is taken directly out of Chapter I.

States

Japan resembles the United/in the wide diffusion of secondary and higher education among her people, and the high pragmatic value placed on education. The Japanese have an extremely diversified school system, and a continuum in quality or prestige of both higher and secondary institutions that matches ours; this diversity is in part, but only in part, a reflection of the reformation of the Japanese school system in an American image during the American occupation period following World War II. Japanese pupils also exhibit as wide a variability in performance on achievement tests as ours. The Japanese have shared with us in an ethic of hard work, though in traditional Japan that ethic was not bound up with the philosophical individualism with which it was allied historically in this country. As we will show, intergeneration mobility in education and in occupational status is and has been high in Japan, as in the United States; indeed, the rapid pace of economic change in Japan virtually ensures a high degree of intergenerational mobility in occupational status. Finally, the Japanese have a substantial highly technological modern sector in their economy, and the Jappanese economy operates as an increasingly open-market system overall despite the much belabored "dualism." At no time, even in her most nationalist days, has Japan stood in opposition to the market system as a matter of principle.

Against this background of characteristics that are shared in significant degree, some important contrasts stand out all the more clearly. First of all, despite some broad common features of the Japanese and American economies, the

structure of the Japanese economy and of Japanese labor markets in particular has been very different from ours. The root of the difference centers in Japan's high degree of paternalism and attachment of individuals to their patrons, and through these patrons either directly or indirectly to their employers. The most widely cited element in this complex is the so-called "life commitment system" in larger enterprises. The "life commitment system," which arose in this form only when Japan was well into the twentieth century, has undoubtedly been receding in importance over the past decade, and the associated dualism that characterized Japanese labor markets fifteen years ago is also receding. But this process is by no means complete; even if a permanent shift is taking place, present and past contrasts with the United States in these aspects of labor markets have conditioned associations between types and levels of schooling and career patterns in ways that remain distinctive. One of the interesting questions today is how these labor market structures and changes in them may condition student perceptions of prospective career alternatives in the future, and perceptions of effects of formal schooling on those alternatives.

Other striking contrasts between the Japanese and American situation are in the school system itself and the way in which it operates. These contrasts reflect both broad underlying societal differences and historical attributes of the Japanese educational system in the decades before (and during) World War II that differ substantially from educational history in the United States. Since this background, along with the present situation, will be discussed in Chapter II, it will suffice here to note just two things: (1) The Japanese educational system, from the very first years to university entrance is and for decades has been marked off by one examination after another. This has important implications for processes of selection in progress through the system and in allocation of students among types, qualities and levels of schooling. (2) Before

the American occupation, Japanese post-elementary education was sharply differentiated by types of curricula, with streaming that was more like the German or the French systems than the American pattern. Evidences of this heritage continue today despite attempts to implant the "comprehensive high school" on Japenses soil. These two features of her heritage give their own coloration to current educational "problems" and "policy issues" as these are perceived and argued in Japan today.

In sum, Japan must be of special interest to the United States for a number of reasons that could be summed up in a paradoxical juxtaposition--the notable similarity in some key attributes that are highly relevant to the interplay between the schools and the economy, but the equally notable contrasts in other critical and highly relevant matters.

II. Some Key Themes

Four fundamental sets of concerns, together with associated fallacies and neglects, that stand out in contemporary talk and writing pertaining to the economics of educational policy lie back both of the research reported here and our complementary research sponsored elsewhere. For convenience we may give them short-cut labels: (1) Access to opportunity; (2) "Social Demand" as a private affair; (3) The creed of vocationalism; and (4) Life-time learning-earning functions. Though these are distinctive in their centers of gravity, they are overlapping in many ways and empirical evidence on any one of them tends to run over into the others.

Access to Opportunity

This theme is probably the most familiar to educators and is certainly the most frequently stressed among sociologists. That it is an economic matter also, and from several points of view, I have argued elsewhere; there is no need

to develop that theme here or to strain the reader's patience by an elaboration of economic theory. Instead we may say in plain enough language that questions concerning access to opportunity occupy an important place in the present report. That question will be examined looking both at the evidence of observed facts and relationships and at aspirations, and looking at the stages of entry to upper-secondary schools, to higher education or the labor market, and to one sort of job or another when a youth begins his working career. The usual sorts of background attributes will be introduced in these analyses, but along with them we consider dimensions in parental background that are usually neglected, the intervening effects of type of secondary course taken, and the implications of expressed preferences and frustrations. In this last respect in particular evidence concerning distributions of opportunity and its dimensions becomes inseparable from the second of the four themes.

Social Demand as a Private Affair

This heading is borrowed from my article "Mass Elites on the Threshold of the 1970's," where I phrased it instead as "Social demand is a private affair." It is just that in the jargon of many educational and manpower planners. Not only is "social demand" in their language what individuals faced with certain alternatives will seek educationally; the adjective "social" came to be used precisely because of a belief that people went to school mainly for "consumer" or for "cultural" reasons, and not as an investment in the acquisition of future earning power or to secure entry to occupations entailing skills that were in demand. "Social" in other words meant non-economic in a narrow definition of "economic," with which it was contrasted. The paradox in this conception must be evident enough when we consider its treatment of occupational preferences. "Social" demand was taken to be dys-economic when individuals were so perverse as to seek entry into inappropriate occupations--that is, into occupations regarded by the manpower planners as

irrelevant or of low priority--even when in making such choices the individual was knowingly opting for lower money earnings. One of the mysteries to me has indeed been how intelligent men of good will could get themselves into such a tangle as to express concern when young people knowingly made occupational choices for which they were willing to pay in earnings foregone. (I am not referring to situations in which narrowly economic incentives encourage exactly the observed occupational choices; the perversity in such cases, if such it is, must be attributed to the operations of the labor markets rather than the preference systems of individuals.) Part of the difficulty is unquestionably in the conventions of national income accounting, which includes in its measures the values of things people buy overtly, but not the value of what a man "buys" when he seeks a more pleasurable way of spending the better part of his waking hours at the "price" of accepting lower pay.

Just how men's preferences, their economic anticipations, and the judgments and dogmas of manpower experts mesh or fail to do so is evidently an extremely complex matter, and we can hope at the most to glean only a few empirical insights into this important problem from any one piece of research. The main questions that will be touched upon in this connection relate to such matters as freedom to choose and constraints on choice, how far young people see themselves as constrained, how well they are in fact informed in making their choices and in their anticipations with respect to education and careers, and how far expressed preferences match or depart from observed relationships between type of schooling and subsequent educational and occupational experiences. It is with this last question, concerning preferences, that we slip over most clearly into the access-to-opportunity domain. But we also edge up to questions concerning how far types of curricula do in fact condition subsequent educational and occupational choices

not only in an "opportunity" perspective but also in relation to common assumptions concerning the suitability or fit between types of training and types of jobs. This brings us to the third theme.

The Creed of Vocationalism

One of the most vigorously debated arguments in the realm of educational policy and in particular in its relationship to economic-development planning has been that centering around "vocational" education. At long last it seems that the notion of narrowly vocational training in agriculture in the primary schools of less developed nations has been laid firmly to rest. But the arguments over "vocational" education, be it fallacy or revealed truth, continue unabated. Unfortunately we were unable to carry out our initial intentions of undertaking follow-up studies of terminal graduates of the various types of Japanese upper-secondary schools five years or more into their working lives. To our knowledge, no such data exist in Japan, which is a pity in view of the vast compilations of statistics in that nation and the relative ease in specifying unambiguously the content of one curriculum versus another. Only the surveys of new graduates a few months out of school are available. We are therefore thrown back upon what can be put together from those very short-term follow-ups on upper-secondary graduates, from cohort data concerning occupational net shifts (without educational specifications) and on clues from our research into the backgrounds, plans, anticipations and expressed preferences of seniors in the various types of curricula. Once again, it can be seen that evidence on these matters ties in also to findings that relate to themes (1) and (2). But that is not all. In the end an assessment of the roles and limitations of "vocational" schooling of various kinds and in various mixes requires examination and analysis of life-time patterns of learning and earning. More precisely, it requires an understanding of how those patterns are affected separately and interactively by the sort (and level) of schooling a man has

received and the ways in which the labor market operates to utilize human skills and to develop them over the working years.

Life-time Learning and Earning Functions

There has been a quite pervasive disregard of how labor-market institutions in themselves and in interaction with the schools affect the development and utilization of human resources and the distribution of opportunity. That neglect has characterized not only educational policy-makers but also most of those who have called themselves "manpower planners." A few special vocational-training and upgrading programs aside, the implicit position with respect to education for economic development found in most "manpower planning" circles has been that the schools would do the adapting to labor markets and "manpower needs." Reversals of this position, to consider how the labor-market processes and institutions that determine the utilization of available skills might adapt to skill supplies, came at first almost solely in the mood of "making do," or getting over a difficult transition with "makeshifts." No economic criteria were introduced in arriving at these evaluations. An asymmetry was built into this type of thinking from the start, because of assumptions of comparative rigidity in demands for skills for the production of everything except those skills--along with an assumed high measure of long-term flexibility (but with long lead times) in the potentials for human resource formation in schools.

More recent manpower research carried out by the OECD has reopened discussions in this area, as evidence has come forth to demonstrate the very considerable range in skill combinations and education mix within and across economic sectors and occupations at each level of per capita income. However, attention has not as yet been directed toward analysis of the functioning of labor-market institutions and how those institutions affect skill utilization or the careers of men with various levels and kinds of schooling. "Malutilization" has been noted and decried, but

virtually never analytically identified. Meanwhile there have of course been diatribes on the subject of labor-market distortions and constraints (or the lack of constraints) and their alleged inequities. But analytical empirical studies specifically directed to critical questions concerning interconnections between schools and labor-market institutions as these affect (and reflect) human resource formation and utilization are yet to be written.

What we do have, and this is exceedingly important, is a modern economic theory of investment in human beings that encompasses both formal and informal training and learning at work. That theory, developed by Gary Becker and Jacob Mincer, draws a distinction between "general" and "specific" training or learning that hinges upon whether (a) a man can take what he has learned elsewhere, to recoup returns to his skill in work under other employers (or on his own), or (b) he can utilize only a small part of his new competencies anywhere other than in the firm or agency in which they were acquired. Example (a) refers to "Becker-general," example (b) to "Becker-specific" skills. Note, however, that the essential distinction between "general"and "specific" in this sense is not in the kind of skill embodied in a man but rather in the ease with which he can move from one firm to another. Thus, although Becker and Mincer have given labor-market institutions no explicit attention in developing their arguments it is clear enough that whatever reduces the possibilities for inter-firm mobility of the individual makes his skill less "general" and more "specific" Unless schools become in effect captive to particular firms, what is learned in school will be "general" in this sense, however specialized the curriculum may be. But there is also "general" training and learning on the job, paid for by the individual in the higher earnings he initially forgoes when he chooses to work where he will be acquiring skills that increase his future earning power while receiving lower pay than he could get in a job with

less future promise. This Becker-Mincer model has been applied in the United States to analysis of the shapes of life-earning paths, associated with various levels (but not kinds) of schooling and to the study and interpretation of hiring and lay-off policies in private enterprises.[1]

All of this work has been illuminating, and it has stimulated further empirical and theoretical explorations. But there is a critical asymmetry in the Becker-Mincer analysis that has curiously escaped attention. Their model lays great stress on the question of how easily, or at what cost, the individual can move, and on the concern of the employer with the chance that he might move and the strategies necessary to retain him. But there is a total disregard of the opposite question, the question of the ease with which the employer could get rid of a man or, from the individual's point of view, his assurance of tenure. This is what seniority systems are all about, and it is at the heart of the Japanese "life commitment" system. In our research on Japanese education and labor markets we have therefore attempted to gain such perspectives as we could, theoretical and empirical, on the extent and implications of inter-firm mobility and seniority patterns. That part of the work on this topic that is included in the present report refers in the main to anticipations and attitudes. It includes examination of how students and their fathers perceive labor market situations, with special reference to issues in inter-firm mobility and perceptions of post-school learning and training optinns other than higher education. And it incorporates also how young people perceive their career sequences, occupationally and

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[1] -up
As yet only one follow/study for graduates of different types of secondary-school curricula has taken even a first step toward analysis of how types of curricula may interact with labor-market processes in the determination of post-school learning and earning paths, although there have been several benefit-cost studies of vocational versus general secondary schooling.

in terms of earnings, over the post-school years. We are able explicitly to compare these findings across types of courses, whereas in our other research, though we have data on earnings by age, seniority in the firm, size of enterprise, industry, and level of occupation, we have no breakdowns by type of education or training.

III. Opportunity and Preference at Entry to Upper-Secondary School

In the opening sentences of Chapter III we distinguished two ways of looking at selectivity in entry to upper-secondary school and allocations among types of curricula: (1) the "recruitment" view, which asks where people with various levels and types of skills will come from (in the manpower demand perspective), and (2) the "human-investment" view which starts with the individual and follows through on his opportunities and his choices. So long as we stay with the point of entry to upper secondary school it does not matter too much which way we look at it; these are essentially mirror images. But it is more convenient, and for analysis of access to opportunity it is more meaningful, to summarize in the perspective of the individual.

Who Continues to Upper-Secondary Education

Some seventy per cent of Japanese youth now continue into full-time upper-secondary education, a proportion equaled nowhere in the world with the exception of the United States. Moreover, virtually all Japanese youth who enter the upper-secondary institutions continue through to graduation from 12th grade, three years later. There is no high-school drop-out problem in Japan among youth who enter these schools. Given their large numbers, it is evident ipso facto that selection cannot be highly elitist. On the other hand, Japan does not fly in the face of the universal findings that there is indeed some social

selectivity with respect to continuation into upper-secondary education. That selectivity can be observed by geographic area, parental education, and parental occupation using a combination of our sample data, data from surveys conducted by the Ministry of Labor, and data from the population census. The results were as follows:

(1) There are still marked differences in rates of continuation beyond compulsory schooling among young people located in the metropolitan centers and those in the more isolated and least developed of the rural prefectures. The prefecture range for 1963, the year of entry of the students in our interview sample, was from 48 to 84 per cent; five years later, in 1968, that range was from a low of 59 per cent in Amori (at the northern tip of Honshu) to 92 per cent in Tokyo. These continuation rates are unambiguously associated with the degree of urbanization of a prefecture, its per capita income, and its nearness to or remoteness from the major industrial-urban connurbations.

(2) If in 1963 we had known nothing about a youth's background, we would have bet roughly three to two that he would enter upper-secondary school. (The odds are more nearly like three to one today.) Knowing that his father did not go beyond elementary school would reduce our estimate of chances somewhat, but not substantially, since the vast majority of the generation of fathers of the teenagers of 1963 had no full-time schooling beyond the compulsory levels. By our estimates roughly half of the sons of fathers lacking post-compulsory schooling entered upper-secondary school in 1963 as compared with 85 per cent of the sons of fathers who had gone beyond that level. However, that a youth's father had attended university raised the likelihood that he would enter upper-secondary school only slightly as compared with chances for sons of men with middle or upper-secondary schooling.

(3) Negative selectivity did show up as substantial when we pushed down

to the lowest occupational status levels, picking up a minority of the cohorts of fathers (as against the majority with the standard compulsory schooling attainments). These findings, based on linkages of our data with detailed information on age and occupation in the Japanese census, are reinforced by special studies of rates of enrollment in full-time upper-secondary schools. Income makes very little difference until we hit the lowest brackets, where it becomes very important.

In sum, the main conclusion must be that there is indeed selection out at the bottom, and that this has an economic basis whether or not also a basis in tastes or in information biases or gaps. It does not follow that education is regarded as an uninteresting consumption good among those who do not continue, however. Upper-secondary schooling does entail immediate costs, both in foregone earnings and in direct outlays; the latter are in fact considerably more important in Japan than in the United States, even though most students in upper-secondary schools are attending public institutions. What is unquestionably entailed is the fact that poor families are hard pressed and the contributions of youth in their teens to the family coffers can be of critical importance. Japan is no different from other nations in the lack of capital markets for financing investments (largely foregone earnings) in the creation of human capital among these economically disadvantaged youth.

The Allocations among Types of Curricula

Considering only those who gain entry to one or another upper-secondary school, which young people go to which sorts of schools and why? In raising this question we encounter some further complications. One is sheer geographic accessibility, which can be ignored for Japan without doing too much violence to reality so long as we are asking only whether some upper-secondary school is within at least busing distance. Another is what might be termed "type-of-

activity" inheritance, status considerations quite aside. And then there is of course the mixture of status and economic or financial considerations. Here again we can sum up the results in a few main points, though some elaboration with respect to "type-of-activity" inheritance will be required in order to elucidate our meanings.

(1) Distinctions between urban and rural locations are sharp so far as the "vocational" curricula are concerned. This reflects in part the lack of access of most rural people to either commerce courses in the upper-secondary schools or to the technical curricula, whatever their interests might otherwise dictate. It reflects also the pervasiveness of agricultural curricula in rural places, where they are attended not only by farmers' sons but also by youth from other backgrounds--though there is a larger relative representation of farm youth in these as compared with the rural general schools. All this is obvious and straightforward enough. More interesting is the fact that among rural youth attending upper-secondary schools the proportion enrolled in the academic general stream matches or even exceeds proportions of urban youth in that curriculum. On the other hand, urban youth in the non-academic general courses are rare, whereas a third of the rural upper-secondary students were in the presumptively terminal general course. From this fact together with a cumulation of other clues we infer that the rural young people in the non-academic general course are there largely because there is no commerce or technical-course option at hand, although it is true also that these young people have less experience or awareness of the sorts of jobs and occupations to which technical secondary education most often leads.

(2) By "type-of-activity" we refer to a categorization of kinds of occupations that is as far as possible independent of prestige scaling. Several levels of detail in these classifications were used. The simplest was a four-fold break

into (a) white-collar, managerial, and non-technical professional--most of which could be described as "desk jobs" of some sort, despite their great diversity; (b) technical-manual occupations at all levels, from the professional engineer to the unskilled laborer--all involving work in three-dimensions, which could be summed up as in some significant measure "object oriented;" (c) traders, salesmen and service workers dealing with the public; and (d) agricultural and related activities. Each of these categories was subdivided in various ways according to our purposes and requirements for comparisons with data from other sources.[2] We will avoid elaboration here, however,

Associations between type of parental occupation and type of upper-secondary curriculum were unambiguous. Three-fifths of the sons of white-collar men entered the academic general streams as compared with two-fifths for all students and a fourth of the sons of farmers and of skilled manual workers. The strongest representation in the commerce curriculum was for sons of retailers and artisans in the traditional trades, though even among these youth only 26 to 28 per cent entered the commerce courses. Farmers' sons were the most likely to enter both the agricultural and the non-academic general courses, as our previous comments concerning rurality already implied. And it was above all the skilled workers whose sons were most likely to enter the technical curricula, though sons of other manual workers and of high-level technicians and professional engineers were also strongly represented there. White-collar sons and sons of retailers rarely entered the technical courses.

These findings are clearly in line with our initial expectations. With respect to allocations into the technical curricula we reasoned this way: Insofar as fathers influence their sons' choices at entry to upper-secondary

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[2]For an analysis of associations between father's type of occupation and the upper-secondary curriculum in which youth were enrolled we made several splits (shown in Table 3-7) that contributed to understanding the observed patterns.

school (and we have direct as well as indirect evidence that such influence is very important), we might expect that appreciation of object-oriented activities would be greater among those who have engaged in such activities themselves, at whatever level, and conversely for white-collar men who spend their lives at desks and in libraries. Sons of men in the technical-manual categories will, furthermore, be more familiar with what the acquisition of these skills may mean, they will have a greater sense of ease and competence through participant observation (direct or indirect) and will more often be inclined to place a high value on such activities. Thus we find them more often in the technical courses. Status differentials modify this basis of selection into the technical as against the academic general curricula insofar as the latter may be regarded as an intermediate step toward technical higher education and acquisition of competence as a professional engineer or high-level technician.

The association for sons of farmers is obvious, and hardly needs further elaboration, except to note that occupational inheritance in a quite liberal sense may be involved. This does not necessarily lead to enrolment in the agricultural courses--some of the youth expecting to inherit and to operate a family farm were enrolled nevertheless in one of the general courses. That sons of small traders were more likely than other youth to enrol in commerce courses was again predictable, not so much from experience and "exposure" to these activities as because their families saw this as the way to prepare them for effective participation in the business--which is not of course to say that only such youth were enrolled in the commerce courses. Actually they made up a minority of those enrolments.

(3) Socio-economic status as measured by occupation and education and economic status as measured more directly by family income clearly separated the students entering the academic general course from all others. This is not to

say that there was a sharp line of cleavage, of course. But on an eight-category occupational status scale the range in proportions attending the general academic courses dropped from nine-tenths at the top to a quarter in categories 6, 7 and 8. (It should be remembered that these lowest categories were already significantly under-represented in the secondary-school population at large.) The other curricula reversed this pattern in each case, with relatively minor contrasts except as the status rankings for farmers affected the pattern with respect to attendance in agricultural relative to other vocational courses.

The explanation of the demarcation between academic and the other streams is not merely a matter of aims or aspirations, but also of hard economics once again. But now the economics of the situation refers not so much to the upper-secondary schooling in itself as to the way in which choices at entry to upper-secondary schools are affected by expectations for continuation into university, including the costs that this will entail as well as the anticipated returns. Associations between parental income and enrolment in the general academic courses resembled the associations with occupational status among sons of men in wage and salaried employment. Income associations were much looser among sons of non-farm independent or family enterprisers. A very different sort of phenomenon is revealed in the fact that father's education distinguished not only the students in the academic general streams (where parental education tended to be high), but also that it was most strongly negative in its selectivity into the commerce course; there were relatively fewer well-educated parents among students in the commerce course than in others, including agriculture and the terminal general curricula. Finally, one last clue to the effects of economic pressures on allocation among curricula is provided in the fact that there was a distinctively greater minority of youth whose fathers were deceased or disabled among the students in the technical course than in any other.

Preferences versus Realizations in Upper-Secondary Allocations

Analysis of students' responses concerning their preferences at entry to upper-secondary courses, their preferences now that they were seniors, and factors associated with both those preferences and changes in them proved to be highly illuminating on several fronts.

(1) Eighty percent of the students in the academic general streams were in the type of course they had wanted to enter from the start, and very few reported any change of view in this respect. By contrast two-fifths to a half of the students enrolled in other courses stated that they initially preferred something else. The contrast evaporates, however, when instead of taking merely proportions who preferred other courses we take those who preferred other courses and/or other schools. The critical thing from the point of view of many of the college-preparatory students is the prestige of the school and whether/it provides access to the inside track, in training and contacts, to preferred places in universities. This is a well known phenomenon in Japan.

(2) Cross-preferences are predominantly either toward the academic general curricula among students in the vocational schools or toward the technical courses. It is important to note in this connection that the 41 per cent of technical-course youth saying they preferred another course are cut to 25 per cent if we take out those who had hoped they could gain entry to one of the five-year technical junior colleges. These start with the same level as the upper-secondary technical course but continue for an extra two years. Their student bodies are selected on tough examinations.

(3) The most dramatic switches in preferences over their three years in upper-secondary schools were reported by students in the non-academic general stream followed by those in the technical courses. The former looked primarily toward vocational curricula, the technical-course youth toward the academic

stream and readier access to university education. In this connection it is no accident that the students in the non-academic general course were by far the most likely to report that their initial choice of curriculum was due to its easy accessibility to their homes, while the students in the technical curriculum were the most likely to state that they had been inadequately informed concerning options and what those options implied at the time they entered upper-secondary school. Interestingly enough, lack of information concerning other courses was also reported as a reason for what they regarded as a mistaken choice by a sixth of the dissatisfied youth in the academic course. But over-all the main reasons for being in the "wrong" curriculum, whatever that curriculum might be, were stated as parental or teacher pressures.

(4) It is interesting to find that the highest proportions of students in other than their preferred course who gave as the reason failure to pass or to do well enough on examinations were youth in the two streams that are most selective for ability: the academic general course and the technical-secondary curriculum. In part again this reflects failure to gain access to the technical junior colleges, but there are also minorities in the technical/curriculum who sought access to the academic general courses and vice versa.

(5) Finally, there were clear associations, and in the expected directions, among (a) perceptions of the value of technical versus general educatinn as preparation for entry to the labor market directly from secondary school, (b) whether youth were enrolled in the technical course on the one hand or in a general or commerce course on the other, and (c) their preferences relative to the courses in which they were enrolled.

IV. The Higher Education Decision

It was in analysis of the decision to continue into higher education or to go directly into the labor market that we were able to make the most adequate use

of human-investment theory for the analysis of behavior. And at the same time, the higher education decision constitutes a second focal point for investigating forces affecting the distribution and incidence of educational opportunities among the populations of the secondary schools.

It was hypothesized that youth seek entry to institutions of higher education according to their perceptions (and their parents' perceptions) of net benefits of such decisions with respect to career prospects. Those prospects are viewed in terms both of expected monetary rewards and of preferences relating to other aspects of career options associated with direct labor-market entry or higher education. Young people make this decision subject to three main constraints: (a) individual ability or achievement levels in school; (b) economic ability to pay (in an imperfect capital market) for the financing of investments in one's self--even setting income effects on purchase of higher education as a luxury consumer good aside; and in some cases (c) claims of family enterprise on the youth's services, along with special opportunities such enterprise provides for him. Without further specification the third of these constraints is ambiguous in the direction of its effects, however.

Among other testable propositions we introduced the hypothesis that controlling for parental backgrounds, information concerning and perceptions of the advantages of obtaining further education would be a positive function of degree of metropolitanism; the more metropolitan areas presumably make more visible both a wide range of career options and educational selectivity into those careers. We anticipated also that experience in the upper-secondary schools, including not only school activities and training per se but also peer-group traits and increased knowledge of the adult world generally, would modify initial perceptions of college options and the subsequent implications of the higher education decision. The findings concerning secondary-school course pre-

ferences initially and by hindsight had already indicated that substantial shifts do in fact occur, and that they are especially important precisely where information is most limited and direction of endeavor least defined. Among the critical questions concerning the higher-education decision that we attempted to resolve in some part at least was the extent to which decisions at entry to secondary school and at the transition from secondary education to universities or the labor market are interconnected. To avoid a too-lengthy presentation of the many components of the analysis of the university decision and factors surrounding it, this summary of the findings will draw directly from the last summary pages of Volume III, with only minor modifications.

1. It is evident that in Japan the choice of an academic general as against any other upper-secondary curriculum is for most youth simultaneously a decision pro or con with respect to higher education, and is indeed so viewed. But this is by no means the whole story. There are minorities of academic students who do not even take examinations for entry to institutions of higher education, and there are non-academic general and vocational students who do go on to higher education. Proportions of youth taking examinations for higher education ranged between 10 and 20 per cent among the student populations of the vocational schools. The lowest proportions are the agriculture students, who have the fewest hours in basic language, mathematics and science courses. The highest proportions among vocational students are those in the commerce courses, with technical-course students falling in between.

2. Agricultural and technical-course students planning on higher education are most often looking toward a continuation of specialization, but in greater depth and presumably with a strengthening of broad theoretical competencies to back up their expertise. Such commitments are especially clear among many of the technical-school students; the focused determination of

technical-school students seeking higher education is dramatically evidenced in the high proportions of those youth who state definitely that they will take a year or more as rōnin if necessary to achieve their goals. This is not necessarily a matter of a shift in perceptions since entry to upper-secondary school; many of these college-oriented technical students had at least junior college ambitions from the start, and actually tried to get into the technical junior colleges. But there has also been a sorting out of ability within the technical streams, and youth who have been most successful there have set their sights on full university education. Because they have proved themselves in an upper-secondary education that had strong mathematical-theoretical underpinnings, they are also in most instances happy with and oriented toward pursuit of higher technical studies. The survival and re-creation of technical education more in a German-French than an American pattern unquestionably contributes to the formation of this ambitious elite among the technical-school students. They have no real counterpart in the commerce or agricultural secondary schools.

3. High parental education and occupational status exercise significant effects on the likelihood of taking university examinations. This influence operates both via selection into the academic upper-secondary streams in the first place and subsequently, whatever the secondary course taken. At an individual level the former is the more important influence, however. Further within-course effects of parental education operate mainly to distinguish sons from the least educated homes (with the smallest proportions taking university-entrance examinations) from all others. The non-academic general students are a dramatic exception; parental education differentiates among these youth very sharply with respect to their college orientations and examination behavior as they approach graduation. Within-course effects of father's occupational status

are limited, though relationships are generally ordered in the expected direction among students in the vocational curricula. That is, the higher his father's occupational status the greater the likelihood that a youth will seek university education; the lower the father's occupational status the less the likelihood that he will do so.

No such monotonic relationship appears among the academic general students, however. Indeed, among college-preparatory students a youth from the most humble background is more, not less, likely to take examinations for university than a classmate whose father was a highly skilled manual worker or in the lower ranges of clerical employment. Sons of ordinary semi-skilled or unskilled workers who enter academic upper-secondary courses are a very select group of young men, both in their own ability and in the extent to which, one way or another, economic obstructions to the financing of education have already been overcome.

4. Among youth in the commerce, technical, and non-academic general curricula, classroom composition has a highly significant effect on the likelihood of college attendance even after controlling for the student's own background. This relationship is especially strong among students in the commerce course, reflecting characteristics of these students, their families and their expectations that become clear only with examination of their further career expectations and correlates of those expectations.

5. An analysis using schools as the units of observation permitted us to check on relationships among curriculum content, classroom socio-economic composition, and proportions actively seeking higher education as measured by the taking of examinations. "Curriculum" in this analysis was a cardinal measure of credits in
An language, mathematics and science. Using reduced-form equations, that analysis showed that controlling for curriculum there was no systematic upward

bias in single-equation estimates of effects of classroom composition on rate of entry to universities. The identification problem in sorting out effects of parental background on university aspirations once a youth has enrolled in a given course from the effects of enrolment in that course on propensities to attend college is resolved, if we can call it a resolution, in the conclusion that indeed the process works both ways, and independently as well as interactively. Given these findings the initial structural equations may be interpreted with somewhat more confidence, at least in the general orders of magnitude they suggest. Both classroom socio-economic composition and school curriculum come through strongly in the explanation of proportions taking examinations, with classroom composition in first place by a modest margin.

6. Empirically, the first effect of parental incomes is on whether young people attend upper-secondary school at all, and if so where. The very poorest youth are usually filtered out even before entry to any sort of upper secondary school; the most favorably situated financially are the most likely to find their way into a university-preparatory stream provided they have the wish to do so. But economically advantaged students (taking relative parental incomes as the measure) are also found in significant numbers in the commerce courses, which send more of their graduates on to college than do any other except the academic general course.

7. At the transition from secondary school to labor market or university parental incomes are again relevant not merely as predictors of whether a young man will go on to higher education but also as to what sort of education he will pursue and where. Those whose parents had the lowest incomes, the least education, and the humblest occupations most often went directly to the labor market; next comes night school college and university courses (except in rural areas), then national and public colleges and universities, and finally the

private colleges and universities. Taking both sexes together, among the young people attending college or university, less than a fifth of those from the lowest income families attended private institutions and less than a tenth attended the largely female day junior colleges; among college youth whose parents had incomes of $2,500 a year or more, attendance at national universities was only double that for the lowest income group, whereas attendance at private universities is multiplied almost twenty times and young women were going in large numbers into the junior colleges.

8. Among the young men there can be no question but that as family incomes rise a number of factors combine to raise both rates of university attendance generally and attendance at private universities in particular. For one thing, the trade-off between higher money outlays for attendance at private institutions and the costs of taking time as ronin in the attempt to gain entry to less expensive, heavily subsidized education in national and public institutions will look very different. In addition, while high scholastic ability may be a necessary condition for securing economic assistance (directly or indirectly), less able youth with stronger economic backing can buy their way into college without facing severe academic competition. The interpersonal and related career-opportunity network may also be quite different, especially when we contrast the business community and sons of successful smaller businessmen with the professions, government bureaucracies, and corporate bodies. And there can be no doubt but that the proportions of young people whose parents conceive continuation in schools as primarily a consumer luxury and a gentlemanly "finishing" activity rises at an increasing rate as family incomes begin to approach the upper decile.

9. On the negative side, youth whose fathers were deceased were the least likely to anticipate college attendance, especially among those in the

commerce and technical curricula. There is also some negative effect on university aspirations among agricultural students of residence in the more remote rural locations, which may be both a communication and information effect and a cost effect of relative inaccessibility to higher institutions. Conversely, the initial hypothesis concerning positive effects of metropolitanism on college orientation was confirmed exactly where it was appropriate; among students in the general courses.

10. In a very simple world in which "other things were equal" we could predict with reasonable assurance that the greater the difference between earnings anticipated with and without higher education, the greater the likelihood that an individual would opt for entrance to university and would take examinations to that end. Indeed, we can apply this sort of reasoning in a very permissive decision model that gives wide scope for non-monetary preferences and for variations among individuals in those preferences. However, the various "other things," including inter-person differences both in non-monetary preferences and in real costs of further education, confound use of this conventional and otherwise powerful, as well as highly generalized economic decision model for the prediction of which individuals will and which will not elect to continue their education. The conventional model predicts only that if you increase the anticipated earning differential for a <u>given</u> individual you increase the likelihood that he will opt for higher education, and if you do this for an entire group of individuals you increase the proportion among the group who will make the college choice. The tests we used in comparing groups of college-oriented with other students according to their perceptions of prospective earnings differentials between university and non-university men are not the same thing, but they do provide rough substitutes. Those substitutes constitute a strong test in that negative results could still be entirely consistent with

conventional theory; they negate only a rigid formulation that says the other things are either unimportant or invariant across the units of observation.

For this analysis we used two indicators. One was the difference between projected incomes 20-30 years into the future if an individual received university education and if he did not. The other took those predictions and related them to perceptions of earnings that would be foregone while attending university.

The results supported the "economic" or investment decision hypothesis among students in the urban general streams; in every school the anticipated differentials were greater among the students taking examinations than among those anticipating direct labor-market entry. On the average there was confirmation among the commerce students as well. Taking all students across courses but for the urban and rural populations separately, again those anticipating college projected greater economic advantages of college education than did the non-college men; this was especially striking among rural youth. On the other hand, there was very little contrast between the responses of students taking examinations and those not taking them within the technical courses, in the urban agricultural schools, or in the rural general schools. Other factors predominated in sorting these students out between college and labor market--notably: financial constraints, inadequate performance as a scholar, and pressures to terminate schooling to participate immediately in a family undertaking.

V. The Post-School Years

It is toward the post-school years that all of these decisions and the educational endeavors in the upper-secondary and the higher institutions are mainly directed. But leaving school and starting to work is not the end of

the story. In some respects it is only a beginning, albeit a beginning strongly conditioned by what has gone before. It is in the career sequences after leaving school, with their multiple dimensions in types of work, occupational status, employment status, and learning and earning components, that human beings reach toward the full maturity of their contributions to society and the full realizations or frustrations of their hopes. It is through these post-school years that the society is tested, furthermore, with respect to what its schools have done, how well its economic institutions and labor-market processes utilize and further develop human competencies, and how effectively all of these serve human needs and hopes. The simplest way to begin to talk about this here is at its beginning.

At Labor Market Entry

What happens at entry to the labor market is a matter of considerable moment from at least two, very different perspectives. This is the critical point at which really major shifts in occupational structure are most easily brought about, as new men (and women) begin to work and older people retire. The importance of this shift is easily seen in an analysis of the Japanese data, as in data for any ongoing economy. In particular, for example, agriculture is a shrinking industry and new entrants to agriculture are substantially fewer relative to their age cohorts than the proportions of the total labor force in such employment; indeed there is significant net migration out of agriculture at all ages below 40 or 45. Meanwhile, technicians have been few and the new graduates entering such jobs contribute substantially to the supply.

But if the labor-market entry point is important for its contribution to changes in the over-all occupational structure, it is no less important from the point of view of the young people who are boarding the "career buses" that

may take them in one direction or another, at greater or lesser speeds. This is not to say that the first job determines everything thereafter. There may be and in fact are shifts in the early years of working life for many young people; but even the nature of those shifts and their sequential effects will be in part a function of the first regular or full-time job after leaving school. These early years are the period in which the contacts and communication networks on which many future opportunities rest take their shape, and they are the critical years for selective learning on the job--whether there is substantial learning, and if so where it can lead.

Graduates of the commerce courses excepted, there were substantial minorities of terminal graduates of all curricula going into technical, skilled and semi-skilled manual occupations. Among technical-course students the funneling into technical-manual employments was extreme; overall, taking national, public and private institutions together, over 90 per cent entered technical or skilled and semi-skilled manual employments, only 4 to 5 per cent entered white-collar jobs. The students from the commerce courses were almost as extreme in the other direction, with almost 90 per cent of their graduates entering clerical and sales jobs. There can be no question but that the streaming of students in the technical and commerce curricula, whatever its origin, carries over into types of work in their first full-time employments. The situation with respect to agricultural schools is more ambiguous, with something like half entering agriculture, a third going into technical and non-farm manual jobs and about a sixth becoming clerical or sales workers. Finally, the distribution of entry occupations among terminal general students was spread over the occupation categories, with a moderate concentration in clerical jobs.

On the whole there was a remarkable close convergence between these realizations with respect to entry jobs at completion of upper secondary school and the first jobs anticipated by the youth in our samples of seniors in 1966. There was one fairly important discrepancy, however. This was in the proportions of technical-school youth who looked to white-collar employment. Among youth in our sample, which is entirely from the public upper-secondary schools (the vast bulk of the upper-secondary school population) a seventh were seeking or anticipated white-collar employments as against only 4 per cent entering such jobs from technical secondary schools in the previous year. That in this case there was indeed a discrepancy between preferences and hopes on the one hand, likely realizations on the other, can hardly be questioned--though the discrepancy is not a major one. In no other instance was there any significant discrepancy at all. Whatever the constraints on opportunities or freedom of choice, they do not show up in a specification of immediate job expectations contrary to objective evidence concerning operations of the labor market for new graduates of the upper-secondary institutions.

It is unfortunate that we have no evidence to test as to whether the close links between technical and commercial education and entry occupations will persist, how far they may be modified subsequently--especially in view of the fact that the whole system of recruitment into the labor markets from the upper secondary schools tend in the first instance to "fit" the schooling and the job to each other across the person. That some important shifts in kinds of activities do in fact occur is evident from the analysis of cohort net shifts in Chapter VI, but this can give us only the minimal figure for changes in types of occupations that must necessarily have taken place to have produced the net changes in occupational structures by age actually observed over a five-year period. A quite different perspective is to look at what youth in

the final year of upper-secondary school perceived as their ultimate occupational goals or destinations, and how far they anticipated shifts in type of occupation along the way.

Perceived Occupational Destinations

Once again we will proceed by listing a few main findings.

(1) There were substantial minorities of young people in all curricula who had difficulty in specifying their longer-range occupational hopes or expectations, but the largest proportions were among students in the non-academic general courses. This finding is fully in accord with such evidence as is available for the United States. In Japan as here, the terminal general-course student tends to be negatively selected in terms of either achievement motivation or ability, and in any case has the vaguest ideas as to where he is going or wants to go. In Japan especially he is very likely to be a rural youth who has yet to find his way into and in urban life. And it is safe to presume that in Japan as in the United States the graduate of the terminal general course will wander a bit before he finds his career path. Whether he will encounter more or fewer difficulties on this score in the one country or the other, and why, is a question that could be of great interest but on which we have no evidence. It is important, meanwhile, that we not be mislead into generalizing too readily with respect to the general-course graduate as compared with the graduate of the agricultural or the commerce school; unless he is going into farming the youth from the agricultural course is in much the same position as the graduate of the non-academic general curriculum, and the commerce student differs from these primarily in being more often urban. Overall the most remarkable thing that could be said about youth who were unable to respond or who gave inadequate answers with respect to ultimate occupational goals and expectations was how little they differed from youth who did respond--in family background, community traits, and even curriculum.

(2) Associations between types of occupations of fathers and types of occupations anticipated for their mature years by the students were highly significant, but there were marked shifts in the distributions. Those shifts were toward professional ambitions generally and toward higher technical jobs in particular, at both professional and technician levels. The intergeneration movement (or aspired movement) in favor of the professional and high-level technician category is not matched by any ambition among the unskilled to become skilled workers; it is an expression of ambitions among sons of skilled and semi-skilled men, but especially the former, to rise along technical rather than desk-type traditional white-collar employments. But many youth in the academic as well as the technical courses, and coming from diverse parental backgrounds, also expressed hopes and ambitions for technical or engineering careers.

(3) Although the students showed some inclination toward hopes for ultimate attainment of official or managerial posts in government exceeding their parents' representation in such positions, still only a very small minority expressed such hopes or preferences. Their numbers are substantially fewer than the proportions (still not large) who gave government as a preferred employer when asked simply to check preferences with respect to type of employer (including self or family).

(4) Much more striking are the ambitions to become business managers or proprietors (other than in retail trade)--especially among students in the commerce and the non-academic general courses.

(5) The shift out of agriculture is manifest in all curricula, but especially among students in the non-academic general course. More surprising is the drop in the agricultural schools--from 82 per cent of fathers engaged in agriculture to 58 per cent of students anticipating such a life. This is despite

the fact that the 58 per cent includes some sons of unskilled laborers and also that it includes youth hoping to become agricultural agents or officials as well as those who looked forward to farming. That enrolment in the agricultural course is no guarantee that a young man would enter agriculture, even when he was the son of a farmer, is evident. Other parts of our data demonstrate unambiguously what this evidence also suggested, that the choice of the agricultural curriculum is more often effect than cause of the intent of pursuing an agricultural career.

(6) Anticipations of attaining high occupational status levels were much greater among those expecting to go to university than among other students, and correspondingly high among students in the academic general course, though numbers of youth in the technical streams had ambitions for attaining at least moderately high managerial or semi-professional positions.

(7) While sons of men in the two highest occupational status categories generally anticipated relatively high occupational status attainments themselves, there was no systematic relationship between parental status and son's aspiration otherwise. In fact youth from the most humble homes tended to express more ambitious "realistic" hopes (which were distinguished from "dreams," another question) than did youth in the middle of the parental status range. This pattern persisted even when we eliminated rural students. It is the other side of the observation made earlier, that the upper-secondary sons of men in the unskilled or semi-skilled ranks were exceptional in having gained access to upper-secondary education in the first place.

(8) Earnings expectations for the mature years were best explained by university intentions (taking the examinations), by parental income, and by a preference or expectation of independence or employment in a family enterprise rather than any sort of wage and salared employment. Among course types the

highest average earnings expectations for mature years were of course those of students in the academic stream, ninety per cent of whom looked to attending university. It came as something of a surprise, however, to find that the highest mean otherwise was in the anticipations of students in the agriculture curriculum--and this despite the fact that otherwise rural students had much lower perceptions of future earnings (their own or specified according to university or non-university education) than characterized students in urban settings.

Anticipated Occupational Changes in the Career Sequence

There are a number of reasons for expecting that inter-occupational movements over a man's life will normally occur within clusters of activities of more or less the same general type except, perhaps,as a change in "type" may be involved in the acquisition of managerial authority. It is probably a characteristic of all societies, and certainly of Japan and the United States, that the age pattern for proportions in managerial positions rises from a very low figure in the early years to a peak in the late forties or the fifties, declining only slightly before relatively universal retirement years. This phenomenon is of course reflected in the anticipations of our students. But let us take things up in more systematic order.

(1) Minimal anticipated occupational changes between entry job and mature occupation was evidenced among youth expecting to start out in agriculture and related employments. Among sons of farmers attending rural schools, the group most likely to enter agriculture in the first place, two-thirds expected to remain in this field throughout their lives. The anticipated out-migrations from agricultural activities are in accord with what our analysis of cohort data suggested, though the rate of out-migration suggested by these students is modest.

(2) Next to those starting in agriculture in their expected adherence to

initial type of occupation were those who stipulated an expectation of entry to higher white-collar positions, including non-technical professional occupations; these were mainly students who expected to attend university.

(3) Half of the youth attending urban schools and anticipating that their first jobs would be at higher technical levels expected to continue in that category throughout their lives. The single most important category to which they expected to move was to managerial posts in which they would continue to use and build on their technical qualifications. It was above all youth in the technical schools who dreamed these dreams, and not just as "dreams" but in response to the question concerning "realistic" expectations.

(4) The only other category that approached a 50 per cent persistence rate was students who expected to start in retailing and services, and among these only the sons of non-farmers attending rural schools. Otherwise youth expecting to start in retailing or in service occupations saw this as a temporary activity, usually leading into one or another white-collar or desk job in other fields. So did youth stipulating clerical or lower manual jobs at the start.

(5) It is only among the university-directed youth and among youth in the academic curriculum in particular that as many as half of those looking ultimately to white-collar employments expected to start out in such jobs. On the other hand, a vast majority of those specifying as their long-run expectations technical-manual employments expected to start in that general category. Unquestionably we are observing in these data the combined effects of perceived limitations with respect to acquisition of appropriate qualifications in crossing from one to another of the major types of occupations and the negative status implications of movement into the technical-manual category without major investments in acquisition of technical skills.

How far youth coming from the technical curricula may be able to shift

without losing ground will depend upon both the extent to which their schooling supported acquisition of language as well as mathematical skills and how far the labor market structures and processes open up or impede opportunities for development of the kinds of contacts and post-school learning experienced by youth going directly into white-collar employments. It is by no means accidental that how far students perceived training in the firm as a desirable opportunity was negatively associated with the status and earnings levels they hoped and expected ultimately to attain. This is in part because training was perceived in too limited a sense, which brings us to a sixth point.

(6) There has been and is a very open structure within big enterprises in Japan, with relatively little tradition of "job analysis" but much moving about of men and adaptive adjustments both in the organization of work in the enterprise and the reshaping of men to the tasks. Just how that system is changing today and how the opportunities for such informal but extensive learning at work relate and will relate to school education is a question that would be well worth careful study.

VI. Concerning being Independent

Readers who may be interested in our findings concerning perceptions of labor markets, labor mobility, and related matters among our sample of students and their fathers had best turn to the third section of Chapter VI, where the nature of the opinionaire and responses to it are elaborated. But before closing this overview there is one further theme that deserves special even if only brief mention. This is the matter of interplay between parental independent enterprise status and the parameters of educational and career decisions. Throughout we discovered marked contrasts between the sons of wage and salaried men and the sons of men in independent or family activities. Brief note

has already been taken of this in connection with sons of farmers, and the circumstances under which they enter agriculture. But that is only one aspect of the picture. Among sons of non-farm enterprisers there was, not unexpectedly, a distinctively greater inclination toward independent enterprise even when not in the family firm. There was also quite a different set of perceptions with respect to the value of higher education and the prospects without it. And there was of course a tendency to greater optimism with respect to future economic successes, together with anticipations of more steeply rising income streams. There was also in some cases a special constraint on the options a youth felt were open to him. There is nothing at all surprising in the fact that one young man could write: "I have good news. The family business is going bankrupt so now I can go ahead with my studies." The fact is that the parameters of educational and career decisions are very substantially affected by whether one's parents are salaried people or in business. This situation alters both the non-monetary parameters of choice and the economics of benefit-cost assessments more narrowly defined.

CHAPTER I

AN ORIENTATION: QUESTIONS AND MODELS

Over the decades since World War II, in nation after nation, education has expanded at a pace heretofore unimagined. This phenomenon has precipitated problems and thrown up questions with respect to social policy that are unprecedented in their scale and their ramifications. It has also brought education to a new and central place in the behavioral sciences, and in economics in particular.

This monograph, which forms part of a larger research into schools and the labor market in Japan, is itself one small reflection of the growing policy and social science concerns with education. Although its origin and analytical base rests primarily in economic theory, the monograph draws some essential sociological concepts and measures into its human-investment-decision framework. And though it takes Japanese upper-secondary-school youth as its central concern, the secondary school and its students are seen in the context of an ongoing career development process--a process in which schooling-career sequences are affected by both selection into the schools and universities and the structures and modes of operation of labor markets.

To provide an orientation in some of these respects we have divided this introductory chapter into five sections. Section I sets out in informal non-technical language some of the key substantive questions around which this monograph will be centered, and Section II gives a short statement concerning choice of Japan for our investigations. Section III comments briefly on the nature of the standard monetary decision model most widely used in empirical studies of education as an investment, with brief hints concerning the place of that model (and some of its variants) in later chapters of this book. Section IV is by far the most extensive in this chapter. In Section IV a more generalized, sequential human-investment and career decision model is presented; this model permits the inclusion of both monetary and non-monetary factors in the analysis of human investment decisions and career choice instead of admitting the latter only as control variables. Section V adds brief comments on human-investment in the post-schooling stages, by firms as well as individuals, and on the placing of these decisions in a broader economic-system context.

I. Some Important Questions

Among the educational issues that cut across nations, none are more important than those centering in the secondary schools, with their key roles in preparing youth for entry directly into the labor market, or in selecting and channeling them through institutions of

higher education. This monograph concentrates, accordingly, on secondary schools in the Japanese educational system and in Japanese society. Its empirical base rests primarily on a special survey of seven thousand senior secondary school students, but those data are supplemented by drawing upon some of the results of a companion survey of their fathers and of fathers of primary school children, and by the use of complementary evidence from a variety of published sources. With a few incidental exceptions, the analysis is concerned with males only. We look especially into questions such as the following:

(1) How far does access to this key segment of the educational system reach out to the masses of the population? Is there something approaching "equality of opportunity" in education at this level, and as among the various types of schools and curricula? What are the constraints on youth from various social and economic backgrounds at this critical human-investment decision point, when a youth goes either into the labor market or to one or another type of upper secondary school?

(2) What are the associations between type of secondary school and the aspirations and expectations of last-year students with respect to college or university attendance? How far do other factors work with or against type of school in determining aspirations for entry to university, either directly from upper secondary school or after a further year or more in study (as rōnin) to retake entrance examinations? How far are college aspirations realized, under what conditions?

And how far are alternative kinds of learning and training perceived as substitutes--or perceived at all? Here again we are examining a critical set of human-investment decisions at an important stage in the unfolding of ultimate career patterns.

(3) What perceptions do upper secondary school students display in their ultimate career aspirations and expectations, and what are the associations between those perceptions and the type of upper secondary school attended, family background and experience, characteristics of the community, college aspirations? How far can we disentagle these influences, to sort out and identify the effects of occupational aspirations on the type of course chosen versus effects of type of course on expectations for subsequent careers? Taking quite another point of view, may the over-all distributions of students' projected occupations be regarded as realistic within the limits of any objectively conceivable quantitative projections of "manpower requirements" of the future? If not, are the major discrepancies between student expectations and those of manpower projectors of a kind that suggests any need for modification in educational policies or are they in fact quite irrelevant on that score?

(4) How do students in the various kinds of upper secondary schools perceive the structure of Japanese labor markets and the implications of that structure for their career prospects. And how do those perceptions compare with the ways their fathers see the labor markets, or with available evidence from other sources? This

group of questions necessarily includes consideration of opportunities for training and learning within industry and the degree to which promotion is perceived as dependent upon prior schooling, performance on the job, or seniority. It is of course closely linked to both (3) and (5).

(5) What are student perceptions of their earnings potentials, of the time paths of such earnings, and of effects of university attendance on earnings prospects? Controlling for parental income and status, do students in the various secondary school curricula differ in these perceptions, and if so what might this imply with respect to the human investment decisions at the points of entry to the various upper secondary schools, to universities, and to one type of employment versus another?

(6) Do the decision patterns delineated in the above analyses look "economically rational" in comparisons with evidence on actual earnings of an age-education cross-section of Japanese wage and salary workers? How do they compare with patterns found for wage and salary workers in our samples of fathers of primary and secondary school children--or with those displayed in reports of our parallel sample of self-employed men or members and heads of family businesses? And again, how far might the disparities in these bits of evidence derive from dynamic changes in the Japanese economy; how far may they reflect nothing more than gross ignorance on the part of student respondents so far as age-education-earnings patterns of the

present are concerned? These, of course, are not questions to which there can be exact or firm answers, but they are important questions nonetheless--for both applications of economic decision theory as an explanatory hypothesis and for social evaluation of allocation of resources to human resource formation.

II. Remarks on the Choice of Japan for this Research

Japan was chosen for this study primarily because of its intrinsic interest, whether we look primarily through the eyes of a behavioral scientist or an educational policy-maker. In addition, relevant published Japanese data are exceptional in their coverage and their reliability. And last, but by no means least, qualified Japanese colleagues were interested and ready to collaborate in carrying out a special survey among the senior secondary school students and their fathers (along with fathers of primary school children from the same catchment areas).

Japan must be of special interest to the United States for a number of reasons that could be summed up in a paradoxical juxtaposition--the notable similarity in some key attributes that are highly relevant to the interplay between the schools and the economy, but the equally notable sharp contrasts in other critical and highly relevant matters. This situation provides interesting possibilities for analytical comparisons, though it is also slippery, and looking across societies

such as these, one must be continuously on guard to distinguish the mirage from the ground beneath it. With this warning, we present a grossly over-simplified preliminary summarization of some of the relevant commonalities and contrasts.

Japan resembles the United States in the wide diffusion of secondary and higher education among her people, and the high pragmatic value placed on education. The Japanese have an extremely diversified school system, and a continuum in quality on prestige of both higher and secondary institutions that matches ours; this diversity is in part, but only in part, a reflection of the reformation of the Japanese school system in an American image during the American occupation period following World War II. Japanese pupils also exhibit as wide a variability in performance on achievement tests as ours. The Japanese have shared with us in an ethic of hard work, though in traditional Japan that ethic was not bound up with the philosophical individualism with which it was allied historically in this country. As we will show, intergeneration mobility in education and in occupational status is and has been high in Japan, as in the United States; indeed, the rapid pace of economic change in Japan virtually ensures a high degree of intergenerational mobility in occupational status. Finally, the Japanese have a substantial highly technological modern sector in their economy, and the Japanese economy operates as an increasingly open-market system overall despite the much belabored "dualism." At no time, even in her most nationalist days,

has Japan stood in opposition to the market system as a matter of principle.

Against this background of characteristics that are shared in significant degree, some important contrasts stand out all the more clearly. First of all, despite some broad common features of the Japanese and American economies, the structure of the Japanese economy and of Japanese labor markets in particular has been very different from ours. The root of the difference centers in Japan's high degree of paternalism and attachment of individuals to their patrons, and through these patrons either directly or indirectly to their employers. The most widely cited element in this complex is the so-called "life commitment system" in larger enterprises. The "life commitment system," which arose in this form only when Japan was well into the twentieth century, has undoubtedly been receding in importance over the past decade, and the associated dualism that characterized Japanese labor markets fifteen years ago is also receding. But this process is by no means complete; even if a permanent shift is taking place, present and past contrasts with the United States in these aspects of labor markets have conditioned associations between types and levels of schooling and career patterns in ways that remain distinctive. One of the interesting questions today is how these labor market structures and changes in them may condition student perceptions of prospective career alternatives in the future, and perceptions of effects of formal schooling on those alternatives.

Other striking contrasts between the Japanese and American situation are in the school system itself and the way in which it operates. These contrasts reflect both broad underlying societal differences and historical attributes of the Japanese educational system in the decades before (and during) World War II that differ substantially from educational history in the United States. Since this background, along with the present situation, will be discussed in Chapter II, it will suffice here to note just two things: (1) The Japanese educational system, from the very first years to university entrance, is and for decades has been marked off by one examination after another. This has important implications for processes of selection in progress through the system and in allocation of students among types, qualities and levels of schooling. (2) Before the American occupation, Japanese post-elementary education was sharply differentiated by types of curricula, with streaming that was more like the German or the French systems than the American pattern. Evidences of this heritage continue today despite attempts to implant the "comprehensive high school" on Japanese soil. These two features of her heritage give their own coloration to current educational "problems" and "policy issues" as these are perceived and argued in Japan today.

III. The Standard Monetary Human-Investment Decision Model

Every year millions of individuals (or households) in Japan, as elsewhere, are making and acting upon human investment decisions,

whether with deliberation or by default. Thus, whatever the various personal, social and economic factors that motivate continuation into upper secondary school, and into one school and course versus another, and whatever the factors that constrain or block such choices, they are unquestionably important from a strictly human-investment and career-opportunity point of view. So are decisions to take a part-time or less demanding job in order to have the time and energy to continue one's education in night school. Indeed, among the most important human-investment decisions are job choices at the labor market entry point between alternatives that pay relatively well to start with but promise little advance in the future as against those that may bring in less initially but provide learning and promotion opportunities, with higher earnings later on. Similar decisions may be made again and yet again at later stages in a man's career. The scope for such choices, both at the entry point and later, will of course be a function both of a man's prior schooling and of the structure of the labor market.

A human-investment decision model that took all relevant factors fully into account from the start would be an unwieldy affair, and it is no accident that psychologists, for example, tend to place their emphasis on elements in these decisions that discriminate most sharply among individuals, whereas economists simplify in quite another direction, selecting for particular attention those variables that will permit the ready incorporation of individual decision models

into analyses of adjustments and interactions in total economic systems or parts thereof. In its most abstract form the economist's decision model is a very general one, nevertheless, admitting a full range of preferences and attitudes. It is essentially "static" in that it does not incorporate a theory of change in preferences and attitudes, but it does allow for the sequential effects of prior decisions on later ones within an "other things equal" setting. Such models contain implicit (or explicit) specifications of just what the "other things equal" assumptions entail with respect both to the parameters of choice and to the individual's knowledge about those parameters.

In its simplest, and in some ways most powerful, form the economist's human investment decision model is limited to monetary costs and returns only. This is the skeleton model with which most of the human-investment literature begins, and we will do the same. But first a word is in order concerning the conflicts and/or non-communication between sociologists and economists in treatment of non-monetary components of career preferences. Unquestionably some economists have been guilty of inappropriate empirical applications of simplistic human-investment decision models. But more often what is involved in sociologists' attacks on the economic analysis is an unstated difference in approach to a problem and frequently a difference in definition of the problem itself and what is interesting about it. Thus the sociologist is more likely to look for the "most important" determinants of behavior, measuring "importance" either

by responses on questionnaires (of varying degrees of methodological sophistication) or by how much of the variance in behavior one variable versus another explains statistically. The economist, on the other hand, is more interested in how many people would respond, or by how much, to a given change in a particular variable, holding other things constant; he is more interested in the regression coefficients than in the correlation coefficients. This mode of analysis does not hinge on the use of monetary measures; on the contrary, it could apply to anything whatsoever. But it is distinctively an economist's way of thinking in that these questions are "marginal" ones--how much difference does something make? And this method of thinking is at the heart of both resource allocation theory with respect to economic systems as a whole, and decision theory applied to individuals--whether as maximizers of "profits" or of "utility." It is this approach that permits the economist to concentrate on monetary returns and costs even in situations in which responses to them may be quite "inelastic." But, equally important, in empirical applications the economist must be quite as careful as other social scientists to look into the "other things that must be held constant" and to assess their effects. Ultimately, this can bring us full circle back to non-monetary preferences and then on to monetary benefit/cost assessments and supply elasticities once again.

Basically, stripped to its bones, capital theory as applied to investment in human beings is very simple. It has three essential

components: (1) the net life-income stream associated with choice of alternative Y--let us say, for example, pursuing a four-year college education; (2) the life-income stream associated with choice of alternative X, which we may take here to be direct entry into the labor market upon graduation from high school (in Japan from upper secondary school); and (3) some method of adjusting for the fact that the timing of incomes in these two streams may be quite different and that $1,000 today is worth more than the promise of $1,000 ten years from now.

The most extensive empirical measurements of effects of such human investment decisions have used as their first approximation in the delineation of income streams the average incomes of college men and of high school graduates age by age from 18 (at high school graduation) to retirement (usually taken to be at age 65). These cross-section data may be adjusted in various ways to bring them into conformity with cohort streams through time (adjustments for effects of economic growth on earnings), and to correct for departures from assumed relevant homogeneities in the base populations (as ability differences associated with amount of schooling, or race). To start with, the income stream for the men with the college training includes a negative sum for direct outlays (D_t) during the period of attendance at college, and earnings, if any, during that period will of course be much lower for the men still in school than for those in the labor market. In any year t the net earnings of the college men may then be designated

as $(Y_t - D_t)$, those of the high school men as X_t.

If one of these streams was higher than the other in all years, there could be no question about which would be preferred. However, in the example we have just cited this will not be the case. The college men will have lower or even negative incomes over at least the first four years, when they are investing in schooling, but at some point their earnings will rise, and continue, above those of the secondary school graduates. If timing made no difference, we could simply add up the incomes of the college stream (including its negative initial years) and compare them with the sum of incomes of the high school stream; normally, in the example we have cited, the sum for the college men would give the higher figure. But this does not necessarily mean that it is preferable. This is where the third element in the investment assessment comes in, the discounting of incomes according to the distance into the future before they can be realized. Take the subscript t to refer to the number of years into the future at which an income accrues, with t=0 the year of high school completion and t=n the last year of working life, and let the discount rate be i. The present value of the college stream Y_o^*, and that of the high school stream, X_o^*, are found by the simple summations:

$$Y_o^* = \sum_{t=1}^{n} \frac{(Y_t - D_t)}{(1+i)^t}$$

$$X_o^* = \sum_{t=1}^{n} \frac{X_t}{(1+i)^t}$$

The net benefit in choosing the college alternative will be:

$$Y_o^* - X_o^* = \sum_{t=1}^{n} \frac{(Y_t - D_t) - X_t}{(1 + i)^t}$$

Because the Y stream is lower (and even negative) at first, reaching its peak later, high interest rates will reduce the value of Y_o^* more than they reduce the value of X_o^*. At some discount rate Y_o^* and X_o^* will be equal; this is the "internal rate of return." At still higher rates, X_o^* will of course exceed Y_o^*, and the preferred choice will be to stop schooling with completion of high school and enter the labor force. For some purposes, it is preferable, or may be more convenient, to find the internal rate of return and compare it with going rates of interest on other "investments." For other purposes, and in other situations, there may be advantages in taking some external rate of return, i, judged to be "appropriate" and then setting up comparisons of present values of various alternatives. For example, we will make use of the second procedure in comparing life income streams anticipated by senior secondary school students who are enrolled in different curricula, on a preliminary assumption (later modified) that costs of the various curricula are all the same.

Another way of working out these sums is to divide the sequence into two (or more) blocks of time. In our example, we may take the period t=1 to t=4 as the years in college. The undiscounted cost over these years of choosing the college stream is then the simple sum of

the direct costs, D_t and the foregone earnings X_t for the years of college attendance, minus any earnings while in school. Using the same discount rate as before, but cumulating costs to the termination of the college years, gives us:

$$C = \sum_{t=1}^{n} (D_t + X_t - Y_t)(1 + i)^{4-t}$$

The returns to this investment in the ensuing years, discounted back to the date of college graduation, are then:

$$R = \sum_{t=5}^{n} \frac{Y_t - X_t}{(1 + i)^{t-4}}$$

The interest rate, i, equals the internal rate of return when C = R.

Still confining the analysis to monetary assessments, and to individuals' investments in themselves, the model just described may be elaborated in two principal directions. One of these is to extend it to successive choices of job alternatives in the post-school years; where the choices are genuine ones, the decision to take the job with the initial more intensive learning or training opportunity should be reflected in a dampening of incomes in the earlier years, but higher incomes later. This model will be explained more adequately when we have reason to make explicit empirical use of it, in Chapter VI. The other extension is to a consideration of effects of differences among individuals in the interest cost of funds to finance schooling, but this elaboration has been theoretical only. We add no direct

empirical evidence, but we will look at the presumptively related variable, father's income, in our analysis of both allocation of students among types of secondary schools and their college expectations.

Interpreted as an hypothesis for the explanation of behavior, the conventional monetary human investment decision model--like all decision models--is grounded in expectations; the behavior to be explained is related to how the decision-maker sees alternatives and the likely effects of his action in the near and the more remote future. It is an extremely simple expectational model, resting upon assumptions of quasi-certainty or known sets of probabilities of future events, to be sure, but it is concerned with expectations nonetheless. However, with the partial exception of Robert Myers, no one to our knowledge has attempted application of the basic human-investment decision model in a study that included expectational data, and this will be the first study in which expectational data are set beside data of the kind that has been used in prior empirical rate-of-return studies. There are good reasons why this has not been attempted, some of which will become sufficiently evident later. One cannot simply lay the expected against the empirically observed cross-section stream and leave it at that. But neither can the questions raised by such an attempt (or in evading such an attempt) be summarily dismissed merely because some of them are awkward.

IV. A More Generalized Sequential Career-Choice and Human-Investment Framework

One of the principal uses to which the monetary human-investment model has been put empirically has been to test the extent of conformity with or deviation from "equilibrium" under the assumption of narrowly defined economic preferences (or of a random distribution of non-monetary preferences within and between the relevant sub-populations). The procedure has been to compare the empirically estimated private internal rates of return to schooling, using cross-section age-income data, with rates of return to other investments. Or, in some cases, either internal rate-of-return or present-value estimates have been used to compare investments in the acquisition of competence and certification for one versus another of the professions. Marked deviations from equality in internal rates of return signal one or another source of "trouble," though they do not in temselves specify what the "trouble" is: it could be in monopolistic constraints, but it could also be a reflection, among other things, of a systematic bias in the distribution of non-monetary preferences associated with schooling (or with schooling of some kinds), or it could arise because of a critical non-homogeneity in the distributions of ability in one educational or professional category versus another, and so on. Different internal rates of return might also reflect marked discontinuities, for example, in the effects of parental status on what youth perceive as open to them and in how easily they may in fact gain access to some career lines.

Bringing considerations such as these back to the decision point and the individual decision model, it is evident enough that there are a number of important "other things" to be taken into account, whether as control variables or as foci of interest in themselves. This is of course done in the chapters that follow. Our purpose here is merely to present a systematic, simplified preliminary outline map, as it were, of human investment and career decisions as sequential phenomena. To develop this theme we carry the model through a series of discrete periods, each of which is introduced with a decision point and within each of which each individual engages in one, but only one activity as defined by the elements of an activity vector.

Major Vectors of a Sequential Decision Model

Let us start with a cohort of boys who have just completed ninth grade in Japan. We can classify them by their backgrounds, as specified for each of the n elements of the column vector

$$V_b = \left\{ b_1, b_2, \ldots b_n \right\}$$

Each element in this vector could be so defined as to be a compound set of characteristics. Thus b_1 might refer to first sons whose fathers were farmers, had completed elementary school only, and lived in Western Shikoku. (If we had the data, we could subdivide them further by some measure of innate ability, or some attitude variable as

well.) In principle the elements of V_b may be split up into as finely disected a classification, cut on as many dimensions, as could conceivably be relevant But obviously, while the multiplication of dimensions avoids problems of dealing with multicollinearities, too much detail can also clutter the picture--even assuming data to be available, and sample size large enough to justify very fine breakdowns.

In this preliminary sketch, three mutually exclusive sets of activities are specified: full-time attendance at secondary school; full-time attendance at college; and work. We will designate these as vectors V_S, V_C and V_W respectively.

There are five main types of secondary schools that are of central importance in Japan, and a focus of this research. We could split the schools up on other dimensions as well-for example time-distance to the nearest town of 50,000, or to the nearest major metropolis, other community characteristics, elite reputation, and so on. Some of these traits were considered in the sampling procedure, and some of them are introduced into one or another part of our later analysis. However, the key division is by course type, and for present purposes we will simply specify a unitary vector of five elements. Thus:

$$V_S = [\, s_1,\ s_2,\ s_3,\ s_4,\ s_5 \,]$$

Choice of one of these types of secondary schooling is of course among

the alternatives open to and preferred in varying degree by the youth just out of ninth grade. We will assume for present purposes that this choice is an all or nothing one, in that anyone who does not take up an activity within the S set in period (1) will not do so at any later date. Movement from the labor market back into full-time secondary school is excluded by the stipulation of the model.

Kinds of colleges and universities, and of courses in them, are multiple. However, minor forays aside, this monograph will ignore such differences for the most part; and here we will simplify by treating college education as a vector made up of two elements. The first of these is full-time college attendance without going through a stage as a rōnin; all full-time college attendance in period (2) of our model will be of this kind, which we designate c_1. The other element c_2 is college attendance after a period as "rōnin," or study to take university entrance examinations a second, third or indefinite number of times. To keep our treatment of periods simple, we will assume that those who have been ronin do not enter college until period (3) when they attend full time. Thus the vector for college attendance is the unitary vector:

$$V_C = [c_1, c_2]$$

Activity set W is all the activities that could be described primarily as work, having a job, and so forth (or as being an unemployed rōnin). This will of course be an extremely important and complex

activity vector. Meaningful dimensions will quite obviously include the amount of associated on-the-job training or learning, but in any particular job the learning component will often depend upon the prior experience of the individual taking the job. Hence, except where the learning or training component is formalized, it may be not so much a defining characteristic of the job as a function of when the job is taken in a career sequence. Other considerations in the meaningful categorization of elements of a work vector, which we designate as V_W, will be discussed briefly a few pages further on, but this is something on which we will have to go into much greater detail in the body of the empirical analysis. (Evidently if we wanted to incorporate night-school attendance, for example, in our activity vector, we could do this by specifying various combinations of work and night school among the elements of V_W.) We will assume that there are m elements in the unitary vector V_W. Thus we have:

$$V_W = [w_1, w_2, \ldots w_m]$$

Putting these activity sets in the order W, S, C, we may write the overall activity supervector as:

$$V_a = [V_W | V_C] = [a_1, a_2, \ldots a_m | a_{m+1} \ldots a_{m+5} | a_{m+6}, a_{m+7}]$$

The Period (1) Matrix, and
Some Variants Thereof

The period (1) distribution of a new cohort of ninth grade

graduates is represented by the matrix shown below, which we will call the G matrix. Each row of this matrix gives the distribution among activities for those with given background characteristics as defined by the corresponding element of V_b. The first m columns refer to elements of the set W (vector V_W); entries in the cells of those columns are thus the numbers of youth of a given background who have gone to work, and to a certain kind of job, in period (1). Entries in the last five columns refer to those attending secondary school in period (1), and by what type of school. The set C options are not available in period (1) to any of this cohort, and are therefore excluded from the matrix. The matrix will have n(m+5) cells, but in many of these there will be no cases, since many of the jobs included in set W would not be open to young people just entering the labor market from ninth grade.

The entries in the G matrix would normally be what we would observe simply by arranging our data; this is just a cross-tabulation. But we may be most interested in the coefficients that relate the various elements of V_b, the youths' backgrounds, to their various period (1) activities. Those coefficients may have more general applicability. If we divide each entry in matrix G by the total numbers of youth in the corresponding element of vector V_b we obtain such coefficients, which themselves make up the transition (or predictor) matrix P'_G. Reading it the other way, the matrix P'_G, which is

PERIOD (1) MATRIX

$$
\begin{array}{cccc}
 & V_b & W = [a_1 \cdots a_m] & S = [a_{m+1'} \cdots a_{m+5}] \\
\left[P'_G\right] & \left[\begin{array}{c} b_1 \\ b_2 \\ \\ b_n \\ \\ \end{array}\right] & = G = & \left[\begin{array}{c|c} g_{1,\,1'} \cdots g_{1,\,m} & g_{1,\,m+1} \cdots g_{1,\,m+5} \\ \hline g_{2,\,1'} \cdots g_{2,\,m} & g_{2,\,m+1} \cdots g_{2,\,m+5} \\ \hline \cdots & \cdots \\ \hline g_{n,\,1'} \cdots g_{n,\,m} & g_{n,\,m+1} \cdots g_{n,\,m+5} \\ \hline \end{array}\right]
\end{array}
$$

necessarily of the same order as G, specifies the proportions of any given total population with background characteristics identified with a given element of vector V_b who will appear in each activity in period (1). The P'_G matrix viewed as a sort of likelihood map will have more meaning to an individual just entering the period (1) phase than would the G matrix itself.

Up to this point we have of course considered only a very limited school-career stage, and at the most only part of a decision model. Time horizons at the senior-secondary-school entry stage most certainly go beyond termination of that schooling at the end of period (1), but we have not yet said anything about expected effects of present actions on education or job options in subsequent periods.[1] Such expectations must form an essential part of any analysis of purposeful, future-oriented decisions, and we will focus attention directly on them later. For the moment, however, we continue to follow a hypothethical cohort of young people into subsequent periods simply observing the flow patterns sequentially in realized events. Empirical observations of such cohort data could be regarded as both (a) an empirical description of the pattern of sequential choices actually made (though not of the decision process itself), and (b) a starting

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[1]The analysis of "first moves" and relevant future parameters in Modigliani's treatment of business decision-making is relevant here also. For a concise statement see Modigliani and Cohen (1958).

point in the formation of expectations with respect to the future among members of younger cohorts still at earlier states in a career sequence.

The G matrix of period (1), it will be remembered, was initially conceived as a distribution of frequencies--or an ordinary cross-tabulation of numbers of youth with background characteristics $\{b_1, b_2, \ldots b_n\}$ among period 1 activities $[a_1 \ldots a_{m+5}]$, the latter being a supervector with two component vectors--a work set W and a secondary schooling set S. The matrix was accordingly of the order n(m+5). Looking back at the matrix as it was set out, it will be seen that lines have been drawn partitioning it into subsets each of which is defined by an element of V_b and by classification in either set W or set S with respect to period (1) activity. Taking the first subscript to identify an element of V_b and the second to specify whether the period (1) activity was work or school, we may write the entire G matrix as a column supervector V_G with a total of n(m+5) elements, where

$$V_G = \left\{ V_{1.w} V_{2.w} \cdots V_{n.w} \,\middle|\, V_{1.s} V_{2.s} \cdots V_{n.s} \right\}$$

This gives us a short-cut way of identifying every cell of the G matrix, before we go on to carry the cohort into period (2).

Into Period (2)

We have now carried our hypothetical young cohort through period (1), of the first three years after completion of ninth grade. During that period some have attended (and, by the constraints of our

model, completed) senior secondary schools, and others have had various work and possibly training experiences outside of the schools. Each is now looking to period (2). No matter what his period (1) experience, there will be only a limited number of period (2) options conceivably open to a member of this cohort, and a more limited number of interest to any single individual; but the period (2) options and how the individual youth perceives them will also be conditioned in part by his period (1) experiences--along with any effects of his background characteristics and abilities that are not already accounted for by selection into one as against another activity in period (1).

An empirical examination of the ways in which a cohort of youth have in fact sorted themselves out and been sorted out in the movement from background position through period (1) and into period (2) would give us a map of early career stage, showing which paths are heavily traveled in the balancing out of opportunities and revealed preferences, which are more unusual, and which are traveled not at all. Initially one of the intents of this project was to obtain such data by a follow-up study of recent graduates of the secondary schools, but this did not prove feasible. However, we will have data from our sample survey that, together with data from other sources, can take us from background characteristics to period (1). We have limited other sorts of evidence on realized period (1) to period (2) transitions (but without background data), and for the last-year students in senior secondary schools we have background

information (that can be compared with the population at large), present type of school and feelings about it, and expectations for period (2) activity. This transition and its relation to prior paths will thus be examined both from an immediate decision perspective and, with partial overlap of types of data, in terms of realized events.

To continue with the formalized presentation of the sequential career-choice and human-investment framework, we may designate by H a period (2) matrix the rows of which are the elements of Vector V_G and the columns the allowable period (2) elements of the activity vector, V_a; those elements will be $(a_1 \ldots a_m)$ and a_{m+6}. We have omitted the component vector $V_S = [a_{m+1} \ldots a_{m+5}]$ since it was stipulated that no one can come back into full-time secondary school after a period in the labor market. This is an essentially realistic stipulation, and so, for Japan, is the assumption that all entering senior secondary school will complete it. Finally, we have also avoided unnecessary (known-zero) columns by including in our schooling activities for period (2) only the first element of V_C, which is the only one applicable in this period and carries the vector V_a notation a_{m+6}. The order of matrix H will of course be n(m+5)(m+1), since V_G has n(m+5) elements, and we have included for consideration (m+1) activities.

Matrix H is shown below in summary form, designating only its submatrices. The first of these, at the top and left, is $h_{1w.W}$--our notation for a matrix the rows of which are the elements of the vector $V_{1.w}$ while the columns are the activities of set W. Taken together,

PERIOD (2) MATRIX

$$P'_H V_G = H = \left[\begin{array}{c|c} h_{1w.W} & \\ h_{2w.W} & \\ \cdots & \\ \hline h_{1s.W} & h_{1s.C} \\ h_{2s.W} & h_{2s.C} \\ \cdots & \cdots \\ h_{ns.W} & h_{ns.C} \end{array}\right]$$

the n matrices in the upper half (and left side) of the supermatrix H all refer to youth whose activities were of set W in period (1) and who are still in that set in period (2). On the left at the bottom are those who were in secondary school in period (1), but are working in period (2) or, among the elements of set W, studying independently as rōnin in that period. At the lower right are the matrices for those who attended secondary school in period (1) and went to college in period (2). P'_H is the transition matrix by which V_G is multiplied to get the matrix H, though in empirical fact it would presumably be derived by working backwards, to obtain the coefficients implied by the full detail of matrix H itself, which includes all the cohort information through period (2). Note that from P'_G and P'_H we could of course have derived compound coefficients describing the likelihood that someone with given initial background characteristics would follow one versus another path through periods (1) and (2), instead of the one-stage coefficients we derive in examining the distributions one step at a time. In many situations it may be more important to know the one-step likelihoods, however, This will be the case in particular when autonomous factors are altering one set of coefficients (for example, those describing likelihoods that boys with each background will go to senior-secondary school), but there is reason to believe that this will not substantially alter the coefficients constituting the transition matrix from period (2) to period (3). In our terminology, this would be a situation of dynamic change in P'_G but of

remarkable stability, nevertheless, in P'_H. Approximations to just this situation have in fact caused many surprises in recent years. But there are also changes in P'_H that come in the wake of significant shifts in P'_G, sometimes with serious effects in frustrated expectations, where prior relationships of a one-stage transition had been interpreted as stable predictors of what would happen at that stage with oncoming cohorts in a world in which other things had substantially changed. This sort of phenomenon is more often serious at the various labor market entry points than in transitions for those who are oriented to continuing in full-time education; the latter may postpone their confrontations with realities even under circumstances in which frustrations for many lie ahead.

Sequence Neutrality versus Non-Reversability; Period (3), and the Longer View

With the transition from period (2) to period (3) we multiply the number of paths once again, since yet another period has been added to the career sequences. Except for those who were delayed as rōnin, the entire cohort is by now in the labor market, some without any schooling after ninth grade, some with secondary schooling for another three years, and some with university education. If we were to redefine university activities to include a greater range of alternatives, in both kind and duration, we would of course modify the picture further at this stage. But all that is quite obvious. The chief reason for commenting on period (3) in particular is that we are in the first of our periods in which past

experience in the labor force may include pairs of work activities that might be experienced by some individuals in one order, by others in a reverse order over prior periods.

We have allowed, within the matrices in the upper left corner of the period (3) supermatrix K, for distinctions between period (1) and period (2) sequences $w_i w_j$ and $w_j w_i$ in their effects on the distributions of individuals in the period (3) matrix. (This is done by interpreting the notation $k_{1ww.W}$ through $k_{nww.W}$ to refer to supervectors formed from the component matrices $h_{1w.W}$ through $h_{nw.W}$ of period (2) supermatrix H.) Treating the sequence $w_i w_j$ as distinct from $w_j w_i$ is to say that placement of job and training experiences in the work sequence may be non-neutral with respect to acquisition of competence and earning capacity for later use, or that subsequent institutionalized hiring and promotion policies are non-neutral in this respect, or both. If in fact the transition matrix from period (2) into period (3) were symmetrical with respect to the sequences $w_i w_j$ of periods (1) and (2), there would be no need to distinguish the time orders of these experiences. But there are good reasons to expect that in fact there will be important assymmetries, extending not only into period (3) but to subsequent career stages. Some of these assymmetries are probably inherent in the earning process, but others are produced or exaggerated by particular characteristics of both the educational system and labor market institutions.

The middle rows in K all refer to paths through secondary school

PERIOD (3) MATRIX

$$P'_K V_H = K = \left[\begin{array}{c|c} k_{1ww.W} & \\ k_{2ww.W} & \\ \cdots & \\ k_{nww.W} & \\ \hline k_{1sw.W} & k_{1sr.C} \\ k_{2sw.W} & k_{2sr.C} \\ \cdots & \cdots \\ k_{nsw.W} & k_{nsr.C} \\ \hline k_{1sc.W} & \\ k_{2sc.W} & \\ \cdots & \\ k_{nsc.W} & \end{array}\right]$$

in period (1) and either into the job market in period (2), the matrices to the left, or rōnin in period (2). We have pulled out the rōnin components of the W set for period (2), designating them by the letter r, which would make them a sub-vector of V_w in our original notation. These youth are assumed, by our model, all to enter university in period (3), though some of course do not in fact succeed in gaining entry.

Prediction, Preference and Decision

There are many ways in which the generalized model presented in the preceding pages might be constructed, modified, and interpreted. It will be helpful at this point to look at these possibilities somewhat systematically.

1. Matrices that are counts of observed frequencies. Thus far we have spoken of the entries in the period matrices G, H and K as though they were actual counts of the numbers out of an initial cohort of male graduates from ninth grade who followed one or another subsequent path in school or in the job markets. Because each of these matrices incorporates life-path details up to and including the period to which it refers, though not afterward, such a matrix can in itself provide the data for derivation of sets of prior "objective transition probabilities." With or without consideration of intervening "periods" we could of course add a period at the presumed career peak. We could in fact do exactly that in analysis of activities of fathers of the secondary (and primary) school students, though such analysis will be very limited in the present

monograph; father's life histories will be examined more fully elsewhere. Since the matrices we have constructed are, by the way we have specified them, cohort matrices identifying schooling-career paths through time, they cannot be produced from cross-section data; but they can be approximated in some respect from such data. Thus tabulations showing current occupations or earnings for men classified into age-education categories provide a partial, if very truncated, simulation of a cohort pattern under the assumption that nothing is changing so far as the implied relationships are concerned. There is no reason for supposing that either a particular cohort's experience or a cross-section simulation will give an accurate projection of what will happen to future cohorts, though both of these approaches contribute to our understanding of future likelihoods--especially if we have information for several cohorts and/or several cross-sections.

2. Probability and Possibility Matrices. It was impossible to say much of anything about the counts of frequencies of matrices G, H, K and so on without shifting to the associated probability or transition matrices derived from them. The latter are indeed the main reason for our interest in the former. We specified the one-stage transition matrices P'_G, P'_H, and P'_K, each of which could in fact be derived from the associated-period frequency matrices. These might be treated as "objective" one-stage probability matrices. We have noted also that they could be compounded for two or more periods, and over any segments, or for

all, of a life-time schooling-career sequence going far beyond our period (3). However, with every compounding the errors in projection of a particular cohort or cross-section set of relationships to predict future cohort distributions will be compounded. For this as well as other reasons it will sometimes be useful to simplify the probability matrices by truncation to "possibility" matrices with dichotomized values zero or one. In fact any probability cut-off or "surprise" point could be used for construction of such a zero-one transition matrix.

It is evident that the construction of a transition probability matrix from analysis of ex post frequency distributions, whether based on cohort or cross-section data, is not the same thing as the construction of expectational matrices derived from a study of how youth at critical decision points perceive the future. Perceptions of the future cannot possibly be as explicit, or as detailed, as the data potentially available ex post--other differences between anticipation and realizations aside. Nevertheless, they may also be more focussed in some respects; only options that evoke interest will be perceived, whether the interest reflects preference or more pessimistic or fearful awareness of painful probabilities. Even more selective will be those of the perceived future options that are actually mentioned by respondents in an interview or on a questionnaire.

As an individual moves sequentially from one stage to another, two kinds of change in perceptions seem likely. The broad vista of

remaining options will narrow, but the knowledge and appreciation of the characteristics and range of alternatives within broad classes of options will be enlarged. This is highly relevant to the designing of research on human-investment and career choices. So far as studies of individual decision-making are concerned, it points to the importance of selecting criteria for classification of activity alternatives that will be meaningful to the decision-maker at the particular stage or stages of a schooling-career sequence under investigation. But at the same time, what is relevant at each of these stages will depend upon the extent to which future options are conditioned by present choices. Criteria of relevance from the educational planner's point of view and that of the individual decision maker will converge in this essential consideration, even though which kinds of options are regarded as in themselves important may remain indeterminate.

Despite their theoretical concern with decision theory and hence with expectations virtually all economists dealing empirically with human resource development, whether by application of models such as that sketched in Section III or by input-output models using matrix algebra, have confined their work to analysis of ex post behavioral data. This is as true of those who interpret their studies in a human-investment decision context as those who reject that approach. The monetary-expectation constructs avoid some awkward problems. Even theoretically, they do not ask of the youthful decision-maker that he anticipate the

particular kind of thing he will do in his mature years, or even how much he will be earning if he follows one path or another. They do ask that he have a reasonably clear perception of the difference to earnings that will inhere in a choice of, let us say, going on to university versus entering the labor market, but they put much less weight on his perception of even those differences for the later than for the earlier years of his life. Also, we found in this study that many even among students who are unable to give á priori statements about either occupational preferences or expectations may have fairly clear notions or beliefs concerning the net economic advantages or disadvantages of post-secondary schooling. The present study is unique, so far as we are aware, in attempting such an analysis among secondary-school pupils.

Sociologists, psychologists, and educators, like economists, have of course studied empirically observable, ex post, career sequences. But in contrast to the economists, they have also attempted direct explorations of student occupational aspirations--though without explicit attention to more strictly economic variables nor, except quite incidentally, to perceptions of post-school training opportunities and job alternatives that entail such opportunities in varying degree. These career anticipation analyses, though they are still few and limited in scope, have nevertheless now been conducted (mainly by Americans) on four continents: Africa, Europe, North and South America. In

parallel with prior work of both a theoretical and empirical nature on the economics of education, these studies constitute part of the background of the present research. Among the problems very generally encountered in such work are the inability of sizable minorities of students to visualize or to articulate any sort of specific career preferences or expectations, and the impossibility in any case of identifying perceived options as against preferences. Fortunately, however, these limitations need not be as serious as they might at first appear. Even where answers are incomplete, critical dimensions of perceived occupational anticipations may be identified, and while we cannot reconstruct directly the perceptions individuals may have of the range of options open to them if they choose (or had chosen) one educational path versus another, we can build up aspiration matrices from the distributions of responses among students of the various types of upper-secondary schools, and with reference to further educational expectations. These are not so much probability or transition matrices, however, as they are what we might designate as "preference-possibility" matrices--the preferred among the options perceived as possible.[1] Such preference-possibility matrices will form a sub-set of a full zero-one "objective possibility" matrix[2] if

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[1]Or, in questions asking for "realistic" expectations rather than the most unrestrained dreams, the preferred among the options perceived as not "surprising" in G. L. S. Shackle's theory of business decisions under uncertainty. "Surprising" in that context implies likelihood of occurrence so small as to make consideration of the event totally uninteresting.

[2]The term "objective possibility" is used here merely to refer to

we assume no objectively impossible aspirations (however improbable of realization some may be). These personal preference-possibility subsets are important to the analysis of decision-making and early-stage realized choices in a career sequence even when in the aggregate the distribution of preference-possibility expectation patterns is decidedly at variance with reasonable projections of the distribution of future jobs among the members of a cohort. For correct or not, expectations and goal perceptions are parameters of decision-making steps in a career sequence.

3. Value matrices. Instead of a matrix that specifies numbers of cases (or persons) in each cell, or a probability transition matrix, or the zero-one possibility matrices just suggested--or, for that matter, along with these--we might construct one or another sort of value matrix. This would be to put a value (monetary or otherwise) on a unit occurrence in each cell. Indeed, the simplest sort of value matrix, though by no means the only sort, would be one in which a monetary value was assigned to each cell. It may be helpful at this point, therefore, to look briefly at how the matrix analysis and the monetary investment decision model introduced earlier might be brought

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assessments of the "possible" based on analysis of evidence by others than the student respondent himself, presumably with some expertise but without reference to any single individual in particular; the "possibility" refers to all chances deemed to have probabilities exceeding zero for the entire population under consideration (as defined by specified characteristics such as, for example, amount of prior schooling).

together. Instead of treating V_a and its component vectors as unitary vectors, we could have tagged each element with a "price." That price could be an observed dollar value stating, for period (1) for example, the amount the average youth coming directly into job w_1 from completion of ninth grade would earn--let us say $\$w_1$; if we are in a situation in which what a man earns depends not only on what he does but also (however irrelevantly) on what or who he is, we may have to set up an entire price matrix for all the V_b by V_w cells. A simple empirical variant of this sort of matrix for example is a tabulation of earnings separately by race (and sex) for various schooling-occupation categories of a given age cohort. Or the price tags could refer not to observed but to expected values, whether those values match or deviate in greater or lesser degree from empirical observations. Furthermore, just as an earning figure can be attached to each element of activity set V_w (or of each cell in an entire V_b by V_w matrix), so a direct schooling cost would be indicated as part of the specification of each activity in set S, or in the V_b by V_s part of a total V_b by V_a matrix.[1]

Designating such a value matrix as P''_G for the first period, P''_H for the second period, and so forth, we could multiply by a zero-one possibility matrix, which would give us a full set of money-value options for each period for each background/activity cell; these would

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[1]Differences among individuals or categories of individuals in the costs they must incur for any given schooling constitutes a critical part of some models of human investment decisions. See, for example, Becker (1967) and Mincer (1958).

have no frequencies attached, although we would have eliminated, as of no interest, cases that cannot occur in a given period or would cause a very high degree of "surprise" should they occur. Alternatively, each of the values per person in the P'' matrices could be weighted by its probability of occurrence. The resulting money-value relative frequency matrices, when derived ex post from empirical observations, constitute the bases from which we derive the income streams with which economists have in fact worked when using cross-section census data in applications to human-investment models.

There are few, if any, economists working with empirical analysis of private investments in education who have not bemoaned the lack of one or another crucial control variable, whether relating to what we might here classify as background variables (in V_b) or in the more adequate specification of elements of activity vectors. A comparatively detailed specification of the non-monetary dimensions of our matrices would allow a greater refinement of the economist's applications of his monetary human-investment model, since he would be able to make more adequate corrections for relevant non-homogeneities in his populations. But he will also be inclined to simplify, to focus attention as far as possible on the money valuations, treating other dimensions of career sequences as "control" variables, or as matters of the proper specification of what is being priced, from whose point of view. A major reason is the tidiness of monetary measures and their maneuverability. The values entering into each cell of a per-person P''

monetary matrix are more general in the sweep of their relevance than other available valuation measures, simply because they stand for generalized purchasing power. What those values do not incorporate, of course, is the direct personal satisfactions associated with one career path or another that are independent of earnings and are non-transferable --satisfactions (positive or negative) that accrue in the carrying out of the activity itself, in performing on one versus another sort of job, in one versus another occupation or career sequence. Where certain sorts of jobs are quite widely preferred on such non-monetary grounds, we will normally observe earnings differentials that run against the "preferred occupations" and cannot be explained by monopolistic distortions or low-cost training; a commonly cited (and commonly exaggerated) example is the low pay of many clerical workers where there are ample supplies of sufficiently educated labor and at the same time very strong societal biases in favor of "office" as against manual work. Persisting rate-of-return differentials that show up in such circumstances are often designated as "equalizing differences."

It is possible to arrive at essentially this same point from the opposite direction, however--a direction that has been preferred by most sociologists and those of the "manpower economists" who take a particularly dim view of the effectiveness of the market system. Whether they are engaged in merely descriptive-behavioral studies or attempts to analyze and understand educational and occupational choice, these researchers concentrate on the non-monetary dimensions that define

the elements of the V_a vectors, or activity sets. Reversing the economist's usual approach, if the monetary dimension is considered at all (which normally it is not), it will be as a control variable; in effect it is now the monetary instead of the non-monetary benefits that constitute the "equalizing differences"--in this case compensating for differences in non-monetary values attached to involvement in one kind of activity versus another. Background variables, on the other hand, occupy very much the same place in this as in the models that are built centrally around money measures. We will have occasion in the chapters that follow to take both approaches, first separately but eventually in an attempt at integrated analysis of relationships among kinds of activities, value attitudes and income measures.

The monetary value matrix, whether weighted by frequencies or not, and whether ex post or expectational, is an extraordinarily viable construct in dealing with human investment decisions and occupational choice. But it is by no means the only possible variant of value matrices useful for that purpose. Thus, what we designated above as a "preference possibility" matrix is also a kind of value matrix, though a truncated one. To take the simplest sort of example, suppose we look only at student responses concerning their occupational aspirations for the period when they will become fully established, or at the peak of their careers. For each individual there would be just one entry of 1, with

all other entries zero in the (anticipated) peak-career-period matrix.[1] This entry is implicitly a product of a zero-one possibility matrix, which eliminates all inaccessible alternatives, and a dichotomous ranking of preferences such that the most preferred among those entered as one in the zero-one matrix will be counted as 1, all others rating zero. A matrix that shows the numbers of these individuals classified by backgrounds and prior or anticipated prior schooling-job paths will automatically weight each expressed preference-possibility of each individual as 1, instead of weighting each earned or anticipated dollar accruing to each individual as 1. In other words, a simple frequency count of conditioned preference-possibility values parallels very closely a weighted monetary value matrix. Some crucial differences remain, nevertheless. They show up most clearly in the problem of comparisons and summations through time.

4. Sequential Decisions and Comparisons over Time. One of the steps that must be taken in translating the sequential models we have been discussing into effective decision models is to put proper weights on entries that are dated at various distances into the future. Both the monetary values and the preference-possibility values as we have specified them would apply to a particular period only--that period to which the particular matrix refers. The economist's model gets around this by

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[1] We could of course have asked for conditioned alternative responses, which would have given us more than one entry per respondent. We will in fact do this at some points in later chapters, but for the moment we leave it aside to avoid unnecessary complications.

applying a discount rate to derive "present values" from an entire lifetime sequence of averages of anticipated earnings accruing with the pursuit of one early alternative or sequence of early alternatives versus another. Except that for any given positive interest rate[1] the later dollars are discounted more heavily than the earlier ones, one dollar is again treated as another. But what of the more generalized preference-possibility matrices? Can they be handled by a similar method? Formally this could be done, and the parallel is much closer than most people have suspected, but there is one really major difference.

There is at least potentially (though not always in practice for everyone) freedom for the individual to trade future for present dollars and vice versa--even though at a price in interest paid or received, according as one is the borrower or the lender. But experience that constitutes part of the learning process whereby earning power comes to be embodied in an individual cannot be separated from the individual and shifted around in time with anything like the same freedom, and definitely not at a comparable "rate of interest." This means that the non-monetary values associated with one or another activity in period (1)

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[1]The determination of which interest rate to use is another question and can be a critical one. This, of course, is recognized in the construction of monetary decision models and their interpretation. In only one instance, to our knowledge, has there been empirical experimentation with the application of changing discount rates for successive anticipated time periods. (This is being done by Valerien Harvey, in an extension of his research on teacher salaries. The idea was suggested to him by the behavior of some students who decided to set down their own expectations and present value estimates.)

or (3) or (x) or (z) cannot be traded against those in another period as preferences with respect to timing might dictate otherwise. And it means that we are in considerably greater trouble in analysis of the individual's decision parameters. I say "greater" trouble, because the monetary models are by no means fully in the clear on this problem, but the contrast is an important one. For whatever its limitations, the monetary model provides a testable hypothesis and a decision rationale that eludes measurement in the more generalized preference matrix. The distinctive problem is not primarily, as is sometimes supposed, in the mere fact that interpersonal comparisons are involved even in the scoring of preference-possibility values. There are more implicit inter-personal comparisons in monetary summations than we normally recognize. The distinctive problem is that despite interesting developments on many fronts in studies of the social-psychology of occupational choice there is no other proposition with respect to preference orderings that can claim so nearly universal an acceptance as the proposition that, other things equal, men will prefer the job with more money to that with less. This single proposition has permitted the development of empirically testable, and not merely abstract theoretical decision models that can have extraordinary analytical power. No decision model focussed on other variables has yet emerged that can compare with the monetary models in this respect. Yet the fact remains, also, that money is only part of the story, and in some situations it may seem to be a small part. The non-monetary factors are unquestionably important, whether

viewed in their own right or as the meat on an economist's money-measured skeleton.

V. The Firm, the Labor Market and the Economy

The first consideration that served to stimulate this research undertaking was an interest in the effect of labor market institutions and processes on the relationships between learning in school and learning at work, and on relationships between schooling and human resource utilization. A priori observations suggested that Japanese labor market institutions and processes might have some distinctive and important observable implications for roles of education in the economy, and for the locus and timing of human-resource development over the life span. There might, further, be implications in these relationships that would provide illuminating perspectives on patterns observed elsewhere, along with diversities within Japan. The research reported in this monograph constitutes a major part, but still only part, of the total undertaking to explore this question.[1]

There can be no sharp distinction between the more aggregative market analyses and the present study, however. Meaningful examination of student preferences and anticipations, for example, must

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[1]Part of this work is being sponsored by the Carnegie Foundation. We have not yet sought financial support for analyses we hope ultimately to undertake in pursuing a fuller analysis of data from the fathers of our sample surveys.

relate them to evidence concerning the operation of labor markets. Moreover, analysis of adjustment processes in the labor markets and of changes in hose adjustments viewed in-the-large have been built on and gain much of their explanatory power (where they reveal such power) from assumptions concerning the nature of myriads of smaller decisions in interaction--decisions of both individuals and firms.

Gary Becker's work is an epitome of just such an approach, centering as it does at the micro-decision level, but as part of market analysis. But in this he is merely a very traditional sort of economist. What he adds that has contributed in a major respect to the formulation of this research is the extension of capital theory to treatment of learning at work as well as in school, and todecisions of both firms and households with respect to investment in human beings (Becker 1962). Becker poses a basically simple dichotomization of on-the-job training or learning as either "general" or "specific;" all other cases are viewed as mixtures ranging along a continuum from one of these extremes to the other. Training is "general" in this definition when what is learned will add as much to a man's productive potential, and hence (under competitive assumptions) to his earning power, in other firms as in that in which he receives the training. At the other extreme, training is "specific" in Becker's definition when what is learned has value only in the firm in which the training is received, but not elsewhere. Probably because of his reliance on competitive-equilibrium models for most of

his analysis, and for good enough reasons, Becker made less of a point about market structures in the defining of general versus specific training than he might have done, however. Thus the reader is likely to get the impression that "general" is distinguished from "specific" training primarily by the kind of thing that is learned, whereas the critical distinction is of quite another sort: it is whether, under prevailing institutional conditions, men can in fact move from one firm to another without loss of earnings or earning potentials, whatever the nature of their competencies may be. Evidently kinds of skills, as the layman is likely to think of them, and the inter-firm mobility of skills that would make them "general" in Becker's sense have some degree of association, but that degree can be very small indeed in some sorts of labor markets.

The only attempt thus far to apply Becker's analysis empirically is Jacob Mincer's ingenuous estimates of investments in on-the-job training in the United States (Mincer 1962). In order to make that application he had to assume that all on-the-job training (or learning) was "general" in Becker's sense. This implies, among other things: (a) that whatever the actual mobility among firms, the potential for mobility is high and men can make meaningful choices at least once a year, (b) that all costs of learning or training on-the-job were born ultimately by the workers, in lower wages during the training period, and (c) that if we properly account for the value to the worker of his added learning, his wage plus this human-investment fringe benefit will always equal his

maximum potential current marginal product, across all job possibilities. This will happen, according to the equilibrium model, because individuals, in deciding to take one job rather than another, consider not only current earnings but also how far a job that pays less at first may open up higher earning potentials in the future. This sort of variation in jobs as they affect subsequent options is of course built into the sequential framework discussed above, in Section IV, although in themselves the matrix sequences do not incorporate any particular set of assumptions concerning the operation of market forces.

Whereas the individual who receives the training ultimately bears the full costs of Becker's "general" training, this will not be the case for his "specific" training. On the contrary, a large, though indeterminate share of the costs of fully specific training will be borne by the firm. The firm recoups its human investments later, by paying the specifically trained workers less than their post-training marginal productivities. It can do this even in a generally competitive economy precisely because the training has been "specific" to the firm, which introduces a non-competitive element into the situation. Individuals so trained cannot be as productive in any other setting. But for this same reason, neither will individuals bear the full initial training costs by accepting corresponding lower pay; or, more precisely, they would not do this in the generally competitive, year after year choice-making economy that Becker implicitly envisages. If the amount of learning were the same, we should expect flatter life-income streams for those with "specific"

training, steeper streams for those with "general" training. Or this should be the case, at any rate, under the open competitive labor market conditions both Becker and Mincer assume.

In Japan it may not be quite that way, however. Indeed, it is not quite that way in the United States either, but the Japanese deviance is decidedly greater. The reasons for this are closely linked to both paternalistic traditions and obligations in general, and a number of facets of Japanese labor market structure and processes in particular. These are indeed changing, and in directions that bring Japan toward the United States, but how far the change has proceeded is still open to question. Equally interesting is how Japanese youth perceive labor market structure and processes, and the relationships of those perceptions to career anticipations and to schooling and occupational choice. A further elaboration of theoretical postulates bearing on these questions, and of some of the implications of labor market institutions for the modification of such theoretical constructs is better deferred, however. We will come back to this especially in Chapter VI, when attention is concentrated on early post-school experiences as an intervening variable between schooling and ultimate jobs,on the relationships (if any) of these patterns to shapes of anticipated income streams, and on the ways in which students and their fathers perceive the Japanese labor markets.

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